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ABSTRACT

This curriculum guide was designed to give students at the primary level an awareness of Alaska's wetlands and the fish and wildlife that live there. This guide is divided into 13 sections consisting of learning activities covering the following topics: (1) wetland areas in Alaska; (2) water cycles; (3) plants and wildlife found in wetlands; (4) food chains; (5) animals and their habitats; (6) aquatic animals; (7) adaptations of bird species; (8) carnivorous plants; (9) activities helpful and harmful to wildlife; and (10) wetlands conservation. Each learning activity consists of objectives, methods, background information, needed materials, procedures, information about combining with related academic subjects, and use of specific student skills. Suggestions for student evaluation and extended learning activities are included. A glossary and additional resources also are included. This guide contains many illustrations and maps. (LP)

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WETLANDS & WILDLIFE

Alaska Wildlife Curriculum
Primary Teacher's Guide K-3

ED349140

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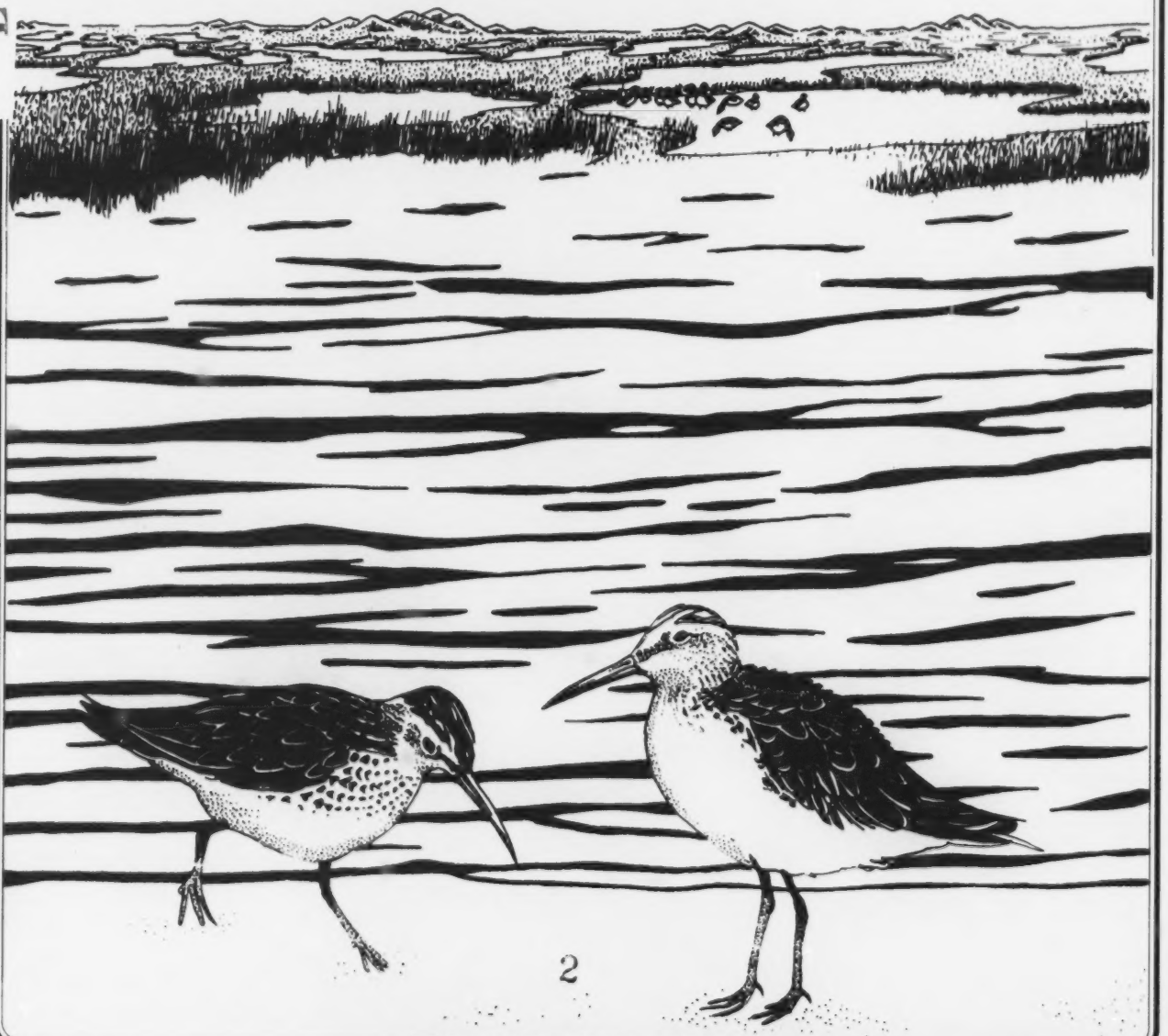

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INTRODUCTION

"...looking is one of life's great pleasures. To be aware of the light and line and color around you, to look long and thoughtfully at something, to read in a shorebird's plumage the marks of wind and water and time, is one of humankind's gifts. Simply being in a wetland offers us vast opportunities to see."

Peter Steinhart
Tracks in the Sky

INTRODUCTION

In 1984, the Alaska Department of Fish and Game developed and distributed an Alaska Wildlife Week curriculum packet with a wetlands theme. Six years later, the department has been joined by the U.S. Fish and Wildlife Service in the preparation of revised and updated curriculum materials. Activities from the original 1984 materials have been combined with those developed for the U.S. Fish and Wildlife Service's Teach About Geese curriculum, which addresses the specific issue of the decline of arctic-nesting geese populations on the Yukon-Kuskokwim Delta.

The Primary Unit consists of the following:

Teacher Information Manual (Part I)
Teacher's Guide
Energy Flow in an Alaska Wetland poster
Migration Game

Supplementary materials (which accompany other units) should also be available as a library resource:

Field Trip Manual
Wetland Cards
Assorted brochures about water and wetland topics

You may use the activities or entire units throughout the year as they best fit into your teaching plans. A range of activities are included to give your students an awareness of Alaska's wetlands and the fish and wildlife that live there, the knowledge to understand the complex interconnections found in wetlands, and the decision-making skills for assuming personal responsibility for involvement in issues affecting wetlands and wildlife.

Activities have been designed for use in a variety of subject areas, including science, mathematics, social studies, language arts, art, and bilingual/bicultural studies.

With these activities, Alaskan educators can make lessons relevant to students throughout urban and rural Alaska. Moreover, students will have an immediate impact on the conservation of the natural resources which form the basis of our economics, recreation, and culture.

WETLAND TYPES STORYBOARD

Objectives

Students will:
1. Recognize that there are many different kinds of wetlands in Alaska.

2. Be able to describe a local wetland.

Method

During the first activity, students will listen to a wetlands-related story and descriptions about different kinds of wetland areas in Alaska and look at illustrations. The class will choose a local wetland and brainstorm a list of descriptive words, then write a class story. For the second activity, students will design illustrations that describe a part of the story on poster boards and share these with the class.

Background

Wetlands are the areas between land and deep water. They include the marshy edges of ponds, lakes, and streams as well as a variety of areas covered by shallow water or underlain by boggy, waterlogged soils (during the open water season). In short, wetlands are places where the water flow situation results in water remaining ponded or collecting near the soil surface temporarily or permanently. Wetlands support plants adapted to life in wet areas. This lesson will focus on five common kinds of Alaskan wetland areas. (See the Teacher Information Manual, Part I, for more information about wetland definitions and Alaska wetland areas and types.)

Materials

- Delver's Danger by Susan Thompson-Huffman (or other book related to wetlands, see Resources section of Teacher Information Manual, Part I, for suggestions)
- poster board
- flipchart
- markers, crayons
- wetland illustrations - class copies

Subject: science, language arts, art, drama
Skills: classification, decision making, designing, discussion, drawing, group cooperation, listening, listing, reporting
Duration: 2 class periods
Group Size: whole class, small groups of 3-4
Setting: indoors or outdoors
Vocabulary: wetland, marsh, bog, muskeg, river, tundra, shallow
Topics: identification of plants and animals, use of senses

Procedure

Activity 1

1. Read Delver's Danger (or similar book). Point out specific instances of how the illustrations enhance and relate to different parts of the story. Discuss the story in terms of the setting. Ask students what a wetland is. Use the students' responses to get across the idea that it is a special place that is wet like a lake or pond but still has soggy soil to grow plants. The water is usually shallow and sometimes even dries up. It is often a place where people sometimes get their feet wet and each step makes slurping sounds. List the animals in the story. Do all of them live in Alaska? Briefly show students the illustrations of five wetland areas in Alaska. Have students name different local wetland areas. Have them decide which of the illustrations these areas most resemble.

2. Have the students choose one familiar local wetland and the wetland illustration that is most like it. Ask students what they would be doing if they could be in the wetland now (watching birds, hunting, picking berries, etc.). What kinds of plants or animals would they see? Go over the wetland illustration and the characteristics of your chosen local wetland (refer to the Teacher Information Manual, Part I).

3. Create a short class story about your local wetland using a flipchart to record student ideas. First, have the class come up with a list of descriptive words using the five senses that evoke a feeling of being in a wetlands. Brainstorm story ideas (for example, "The Day I Got Stuck in the Bog", "Picking Blueberries on the Tundra", etc.) and then use the list of descriptive words to come up with a class story about a local wetland. Students may want to include specific plants and animals or activities that people do in the wetland.

4. Pass out copies of the particular Alaska wetland illustration that the class story reflects and have students color them. Students may use field guides or pictures to accurately color the animals.

Activity 2

1. Before the lesson begins, divide the story into parts: one part for each group of students that will be working together designing illustrations. For younger students, words from the story that are to be illustrated may be written at the top of each group's poster board ahead of time. For older students, parts can be outlined in different colors on the flipchart and copied by students on pre-made lines at the top of each group's poster board.

2. Ask students which pictures they remembered the most from Delver's Danger (or other wetland story). Tell students that they will be working in groups to make pictures to go with their class story (Activity 1). This will help them remember the story when they share it with the class.

3. Divide the students into groups of 3 or 4 to design a storyboard. Each group will take a part of the story and design an illustration for their part. Give each group a poster board and one marker per group member to create a storyboard. Emphasize drawing illustrations that help explain their part of the story. Encourage students to draw plants and animals that they have seen or know could be found there.

4. Tape storyboards on the wall and have a storyteller from each group tell their group's part of the story.

5. Bind the storyboards together to make a big book.

Evaluation

Have students choose partners. Each partner should take turns pretending they are an animal that lives in their local wetland. They must describe what the wetland is like to a visiting duck (the other partner).

Reference

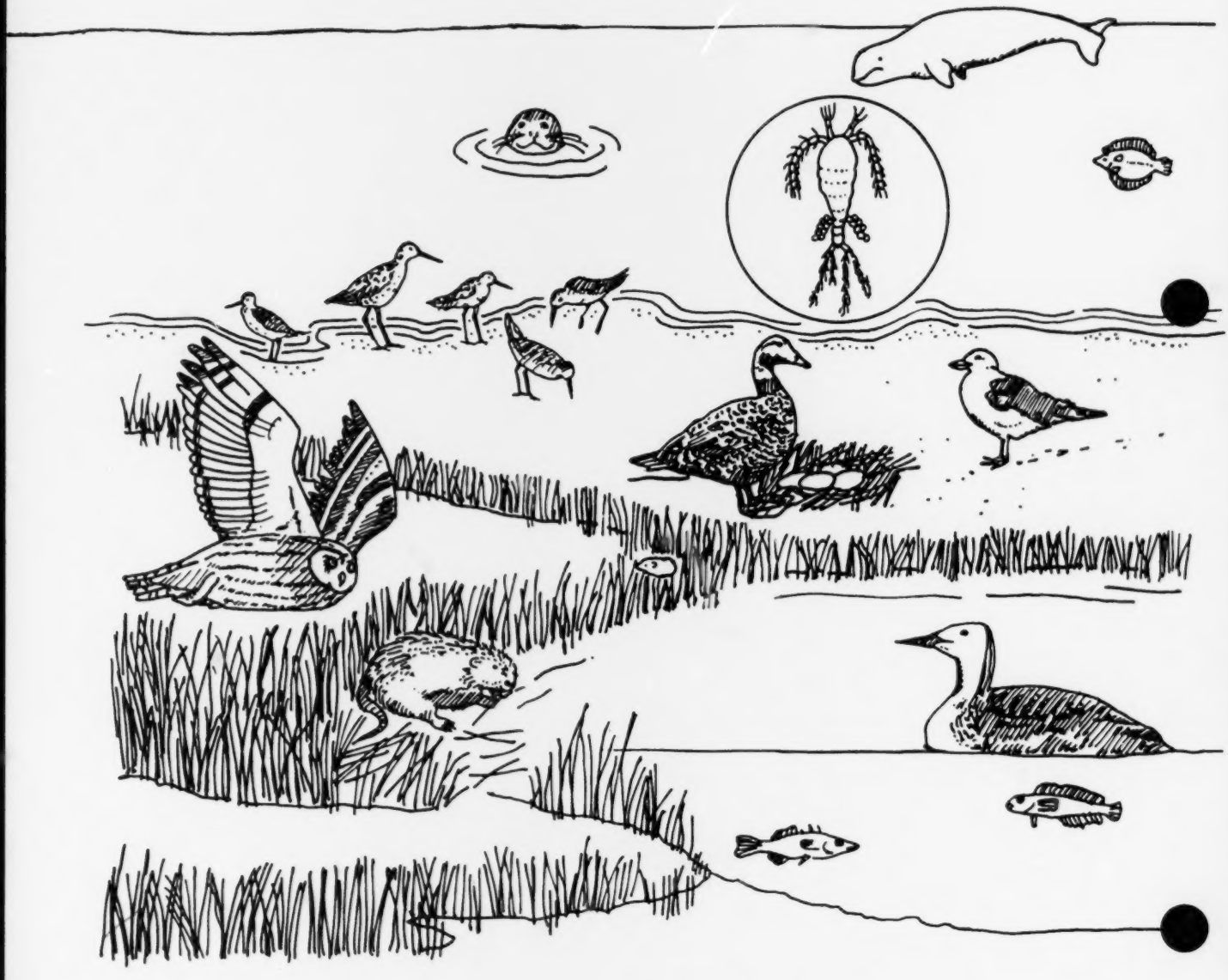
Thompson-Hoffman, Susan. 1989. Delver's Danger. Washington D.C.. Smithsonian.

Extensions

1. Invite a librarian, artist, or writer to the classroom to listen to the class story.

2. Create a class mural after visiting the local wetland. Have the illustrations reflect events that happened on the field trip.

COASTAL AREAS



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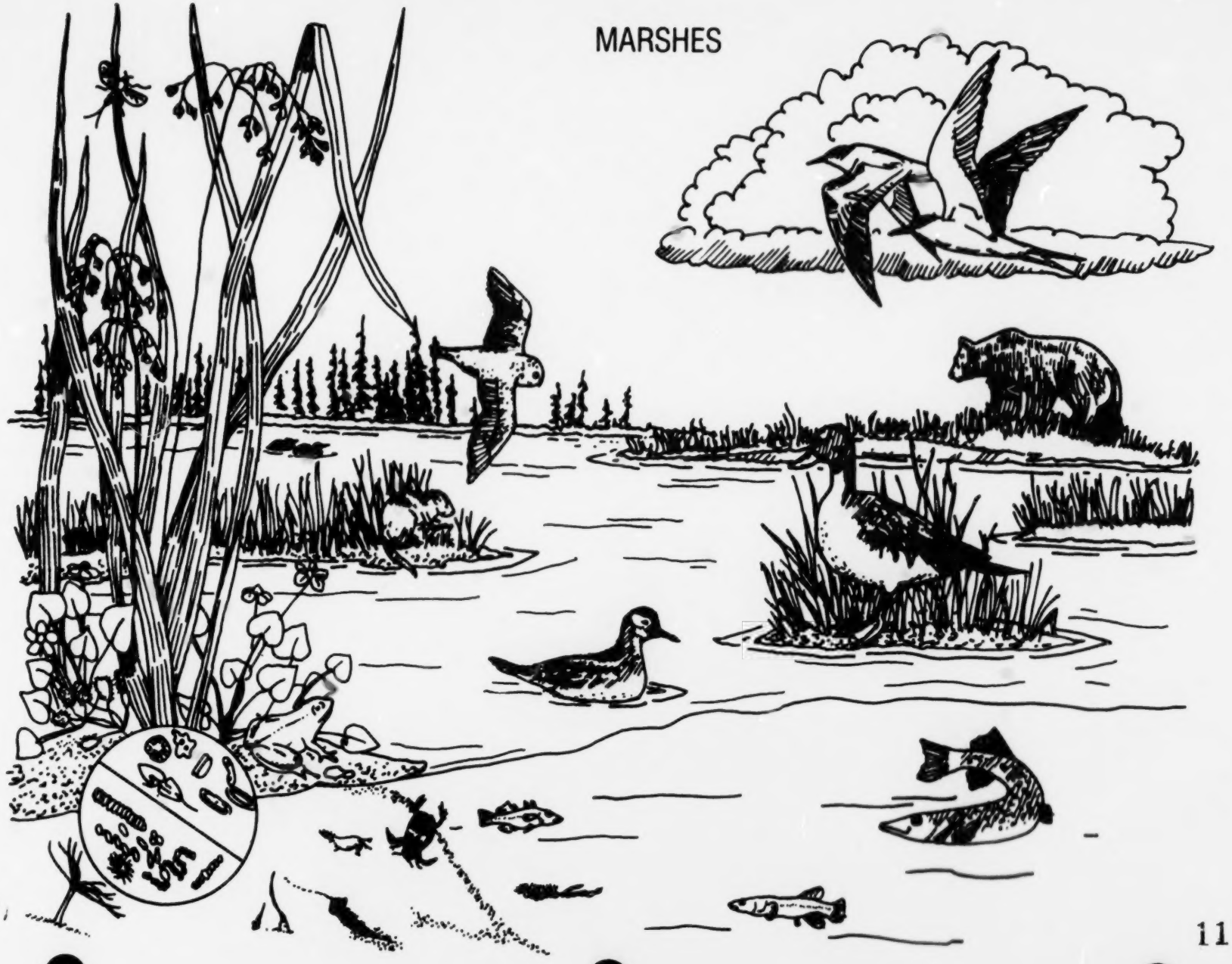
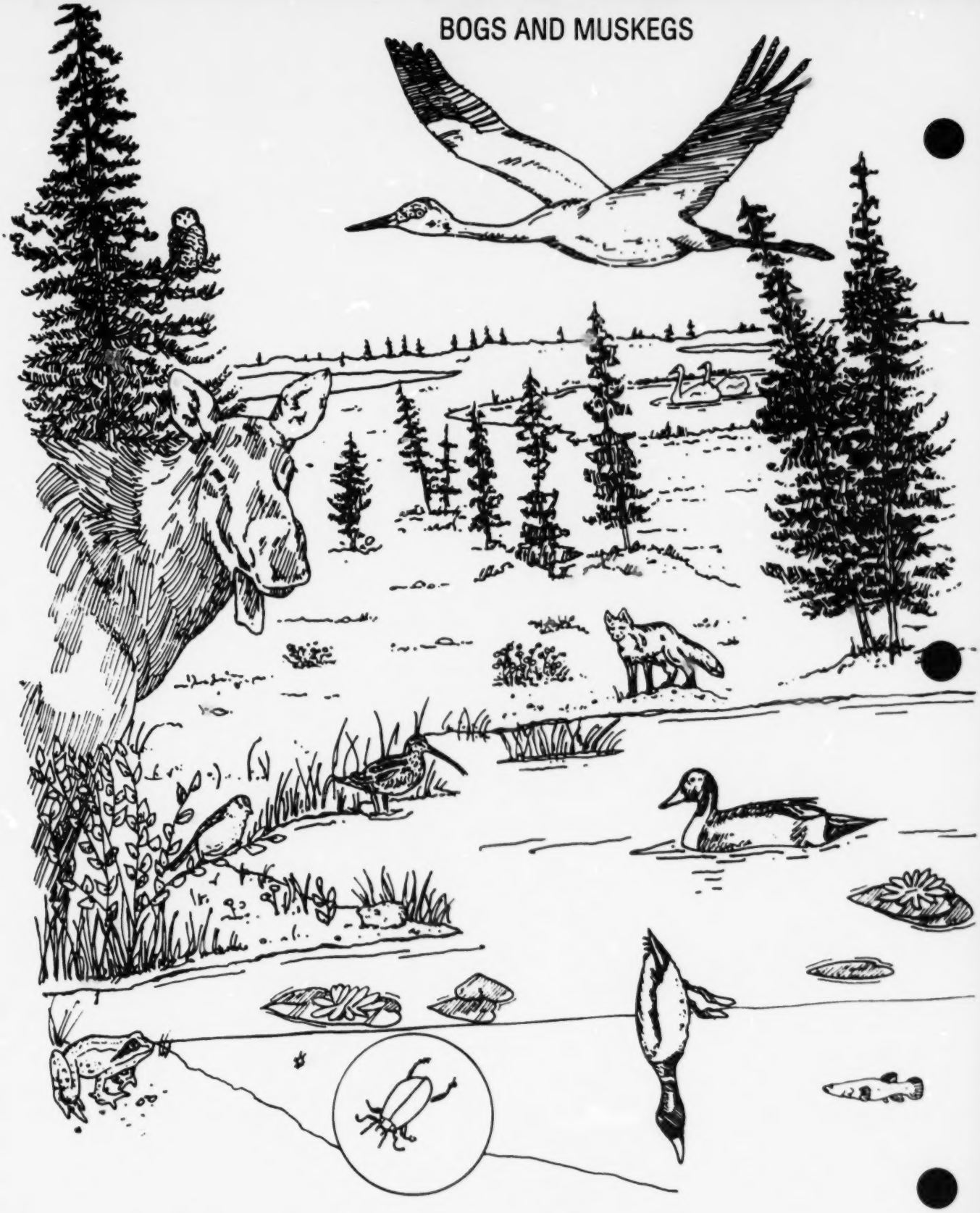
MARSHES



BOGS AND MUSKEGS



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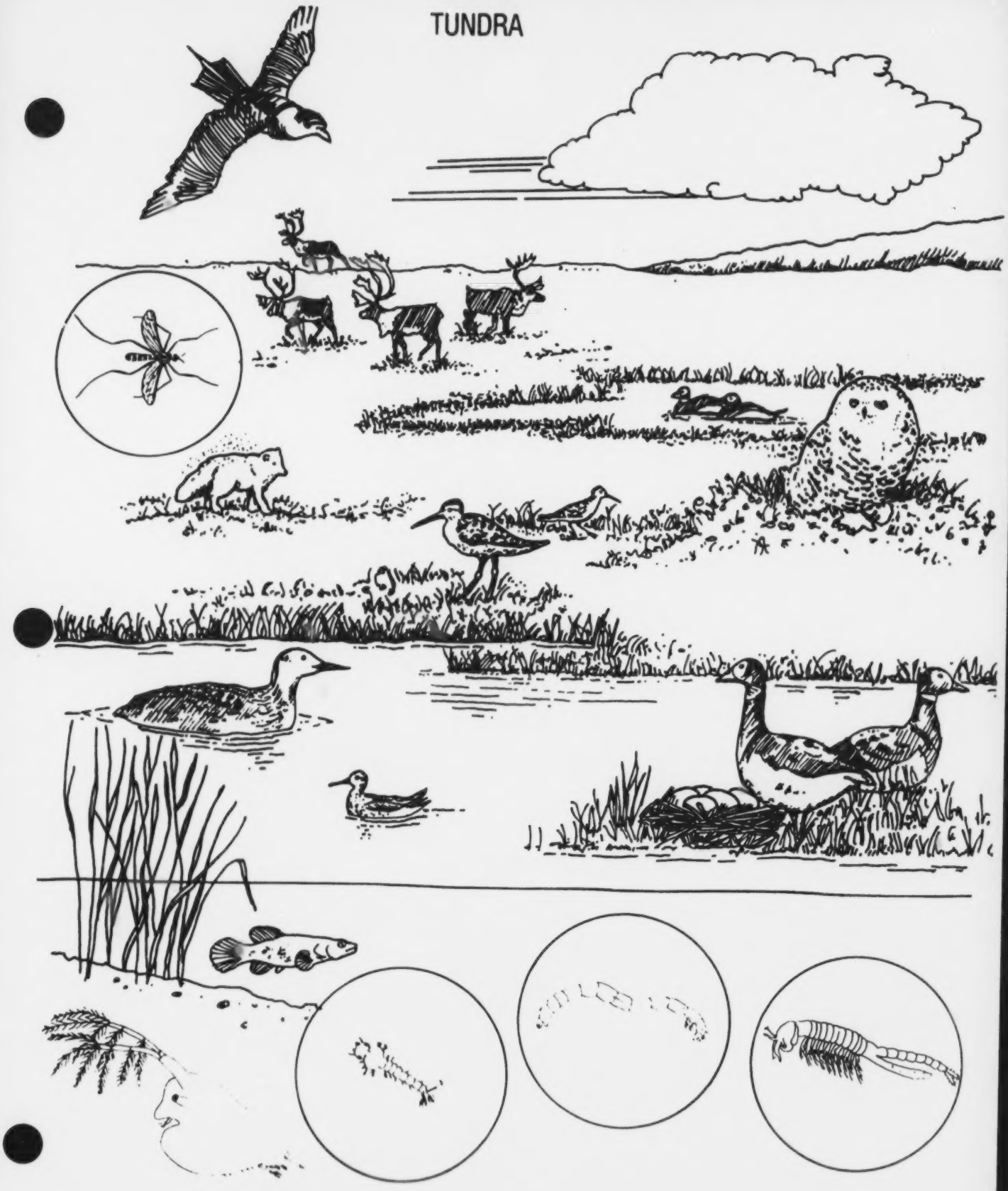

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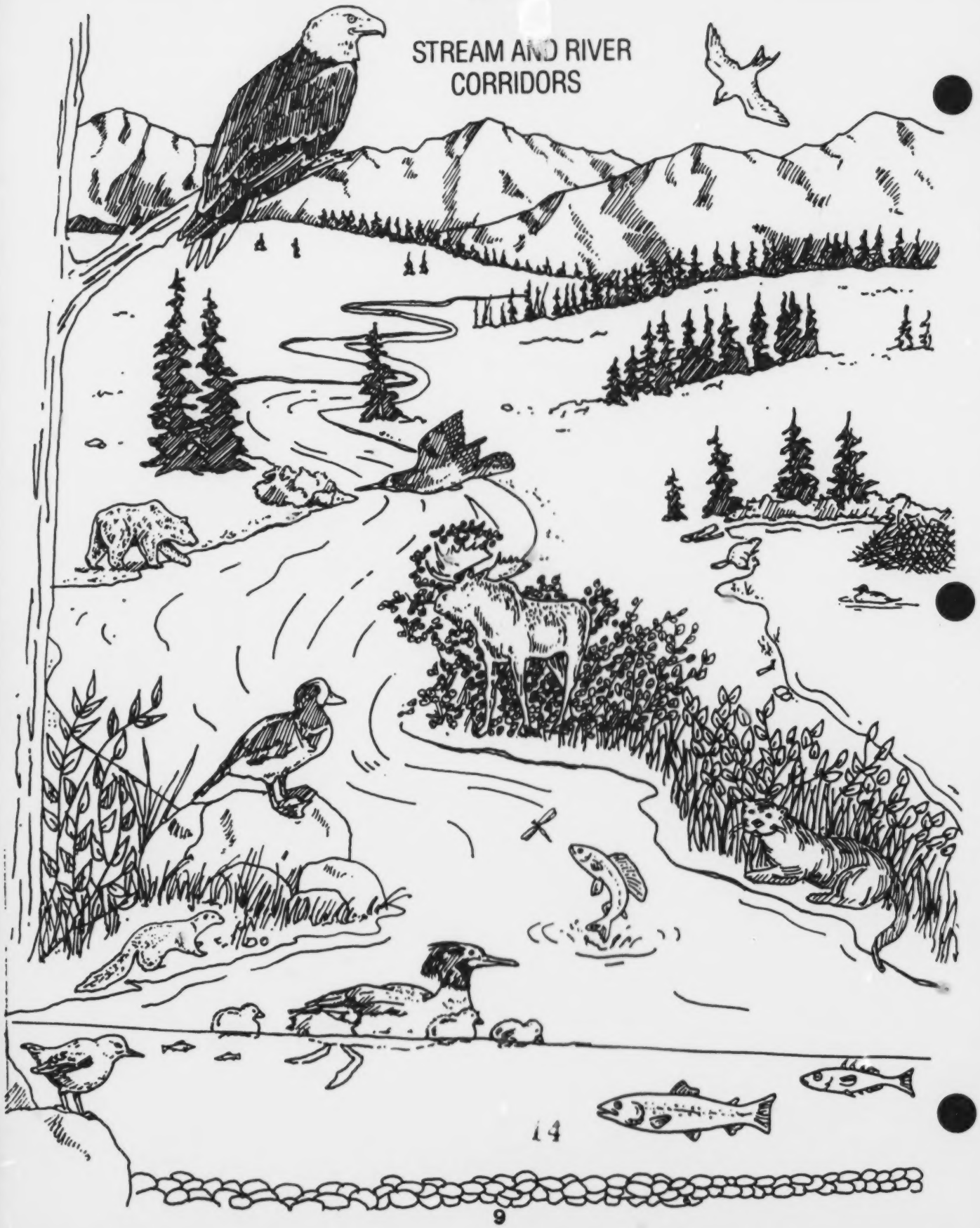
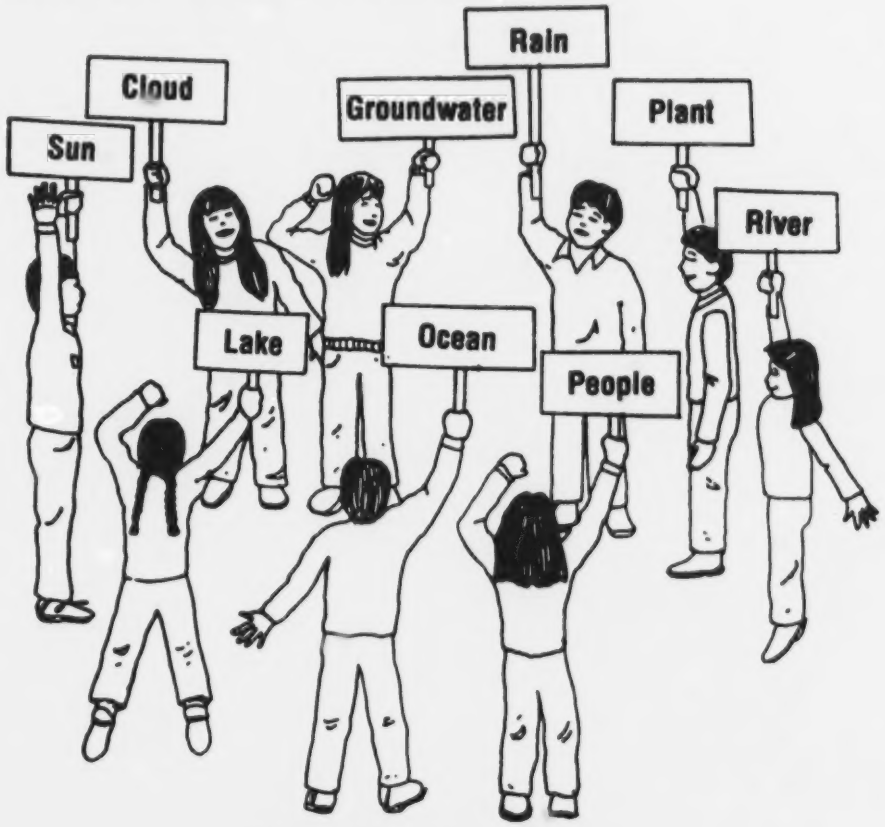

STREAM AND RIVER
CORRIDORS

WATER CYCLE ROLE PLAY



Objective

Students will demonstrate an understanding of the water cycle.

Method

Students will learn that water is recycled; they will role play the water cycle in small groups.

Background

Water cycles from one form to another in the non-living environment and through living things. Water covers over 3/4 of the earth's surface; however, most of this water is salty and unusable to living things that need fresh water. Living things that need fresh water are extremely dependent on the water cycle.

Water is changed into water vapor through the addition of light/heat energy, or **evaporation**. Water vapor in the atmosphere eventually **condenses** into clouds and is moved over land by air currents. Water then falls to the ground as **precipitation** such as rain or snow. Once on the ground, water can either **run off** into streams, lakes, and eventually the ocean (where it can once more be evaporated), or it can soak into the soil. If it soaks into the soil, it may seep down into underground rivers and eventually out to sea (to again be evaporated). Or, it may be taken up by plants and other organisms.

Plants take up minerals that are dissolved in water. In order to get minerals from the soil, all plants pump tremendous amounts of water

Subjects: science, language arts
Skills: reading, role play
Duration: 1 class period
Group Size: class, small groups
Setting: classroom or outdoors
Vocabulary: water cycle, groundwater
Topics: cycles, interdependence

up from the soil and out to their leaves. The leaves extract the needed minerals and send the excess water out into the atmosphere—a process called **transpiration**. Over 90% of the water taken up by most plants is returned to the atmosphere by transpiration.

One tree may pump up to 350 gallons of water into the atmosphere every day. Thus, the amount of plant cover affects the amount of moisture in the air and thus the amount of precipitation. An important side effect of precipitation is that it removes dust, pollen, and other particles from the atmosphere.

Materials

- 2 glasses of water
- role cards with role names in large letters on one side and (for older students) role descriptions on the other side

Procedure

1. Early in the day, get a clear glass and fill it with very cold water (you can add some ice or snow). Ask the students to predict what will happen if they leave it in the warm room. Record their predictions. Later, get out the glass of water and let the students observe. How did the water get on the outside of the glass? What would happen if the water was left out for a week?

2. Introduce the idea that this same water once could have been splashed about by a woolly mammoth or sipped by a gold panner. Ask how this could be possible. Have students think about where water comes from. Ask how water might be re-used. Tell students that nature re-uses water through the water cycle. Show students a simple diagram of the water cycle on a flipchart or large piece of paper. Include the terms used in the role play: person, river, lake, etc..

3. Have students demonstrate the water cycle by reading the role cards in order. The first reading will be card #1, the second reading card #2, then card #3, etc., until the entire cycle is described. Call students up one at a time and have them hold up their role card and read their role followed by a re-reading of previous roles. They are to read the whole line only when they first stand up. All other times, they are to read only the last part of the sentence, beginning with the word in bold (that section may be highlighted for easier reading).

Younger children may be divided into groups to make props that they can hold up. The teacher can read each role card while the students hold their props and gesture where the water goes next. Or, older students can be invited in and stand with the younger students to help them read their part. The rest of the class can try and guess where the water will go next. Have the student demonstrators end up in a circle. Try different variations: students sitting and then standing and pointing where the water will go next or passing a ball or beanbag labelled "water" on to the next person. Have groups of students switch roles or memorize their parts.

Evaluation

Have one student say their role and let the rest of the class guess where the water will go next.

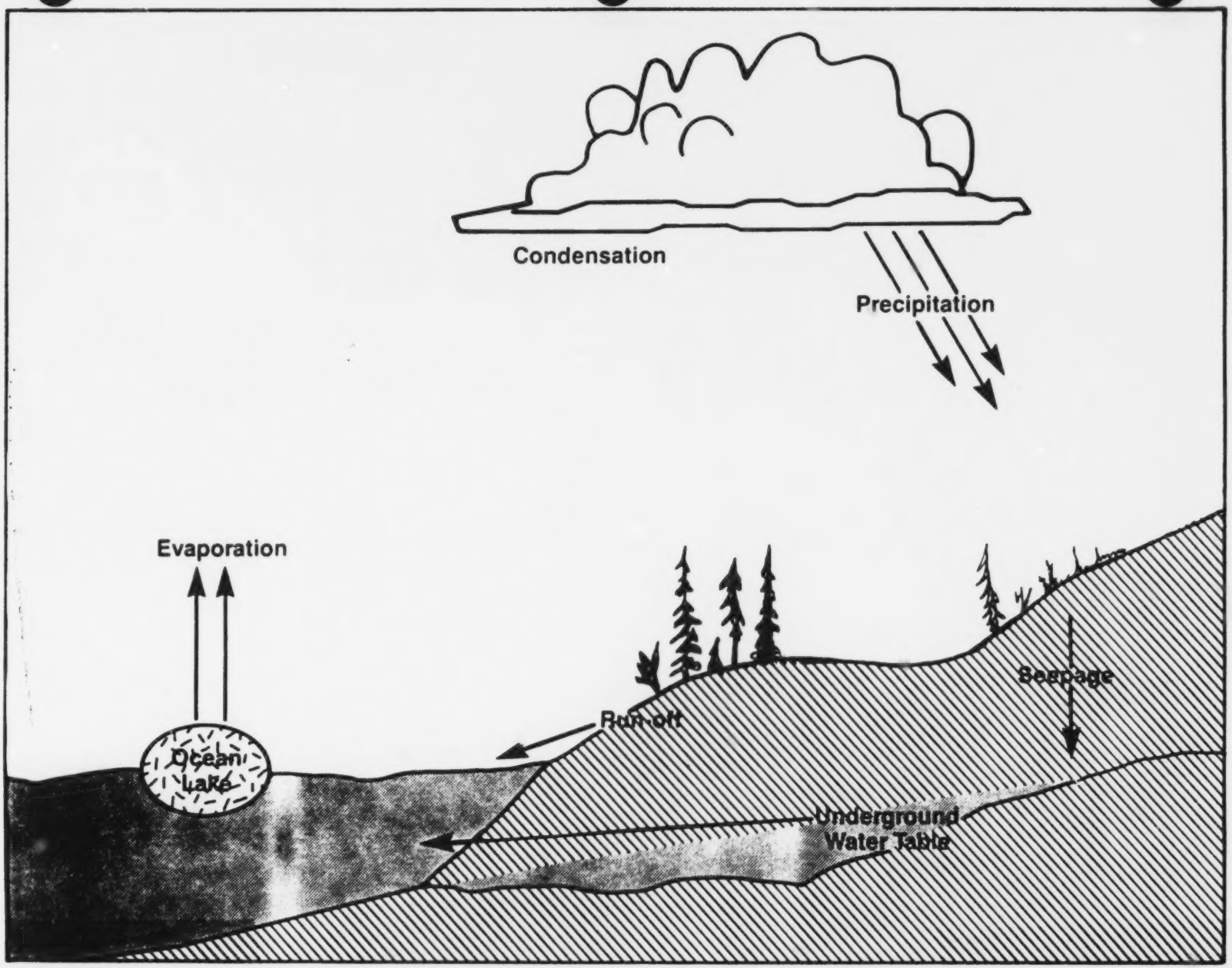
Reference

Ranger Rick's Naturescope. 1986. Wading into Wetlands. National Wildlife Federation.

Extensions

1. Create a water cycle bulletin board using the props the students made.

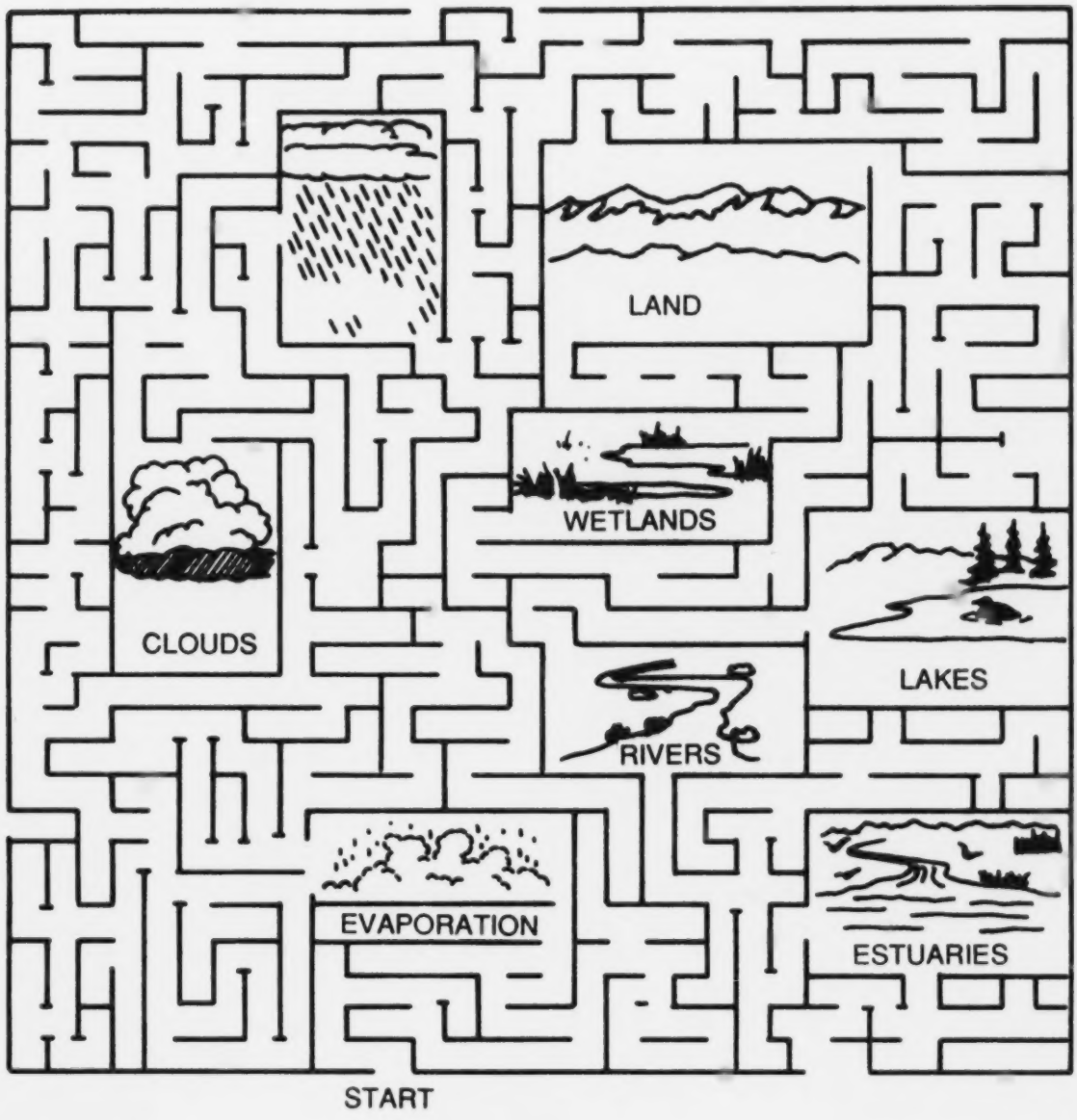
2. Have students complete the "Water Cycle Maze."


Condensation
Precipitation
Evaporation
Seepage
Run-off
Ocean
Lake
Underground
Water Table

Water Cycle Role Play Cards

1. OCEAN	1. We are the **ocean** that gives food to big fish and waits for the....
2. SUN	2. We are the **sun** that shines on the ocean and is covered by a.....
3. CLOUD	3. We are the **cloud** that forms from cold air that gives us the....
4. RAIN	4. We are the **rain** that falls to the ground and is used by the....
5. PLANT	5. We are the **plant** that pumps water up from the soil and lives in a ....
6. WETLAND	6. We are the **wetland** that gives a home to ducks and helps fill the...
7. GROUNDWATER	7. We are the **groundwater** that moves slowly down to the....
8. LAKE	8. We are the **lake** that holds water until it moves to the....
9. RIVER	9. We are the **river** that flows across the land and moves to the ocean where there are...
10. PEOPLE	10. We are the **people** that go to the ocean to catch a big fish.

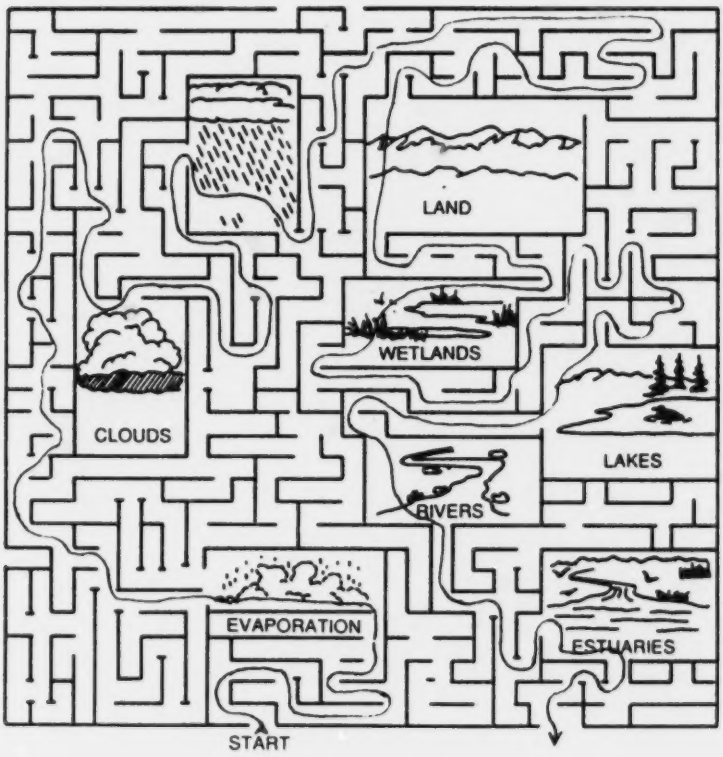
THE WATER CYCLE MAZE



OCEAN

Trace the route of water on its journey from the ocean to land and back.

THE WATER CYCLE MAZE - ANSWERS



OCEAN

Trace the route of water on its journey from the ocean to land and back

21

WETLAND HOMES FOR WILDLIFE

Objective

Students will place wetland plants, fish, birds, insects, and animals in their appropriate habitats.

Method

Students will learn about wetland plants and wildlife of the coastal and inland wetlands by creating a classroom wetland and role playing plants and animals.

Background

Many wetlands are places where the ground is soggy at least part of the year (some wetlands are flooded periodically, but well-drained). Wetland plants and animals have adapted to soil that is saturated with water. Close to 50% of Alaska are wetland areas. Wetland areas are found in fresh and saltwater situations and are of a variety of types. Wetlands play important roles in the water systems that ultimately flow to the sea. Many are crucial for fish and wildlife survival, and they provide recreation as well as water and food for people. Wetlands act as natural storm buffers and help prevent flooding by soaking up heavy rains. Wetlands also filter pollution and are abundant sources of such edibles as fish, birds, crabs, shrimp, clams, berries and other plants. Wetlands provide birds with nesting areas during spring and summer and feeding and resting areas during migration and winter.

Wetlands often are more productive than the best agricultural areas. In Alaska, wetlands collectively support

Subjects: science, art, drama
Skills: designing, cutting, pasting, role play, observation
Duration: 1-2 class periods
Group Size: individual, group or class
Setting: classroom
Vocabulary: habitat
Topics: habitat for wildlife, identification of plants and animals, diversity, wildlife ecology

large numbers of birds, fish, and mammals such as beaver and muskrats. Decaying vegetation from wetlands contributes nutrients to the water, which eventually finds its way to sloughs or streams. These nutrients are used by algae and tiny floating plants and animals (plankton) which in turn are eaten by insects and fish and eventually by bigger fish, birds, and mammals. The entire Alaskan salmon industry depends on the preservation of streams and surrounding wetlands where salmon spawn!

Materials

- Wetland Role Cards
- butcher paper and markers
- masking tape

Procedure

Turn your classroom into a wetland. Use the butcher paper and markers to create imaginary water, soil, and sun. Student will role play the different plants and animals in their wetland homes.

Clear away desks and chairs so the children can imitate the animals growing, eating, drinking, and hiding. See the Wetland Role Cards for some tips to weave into your fantasy. Older students may be given copies of the role cards for role play ideas.

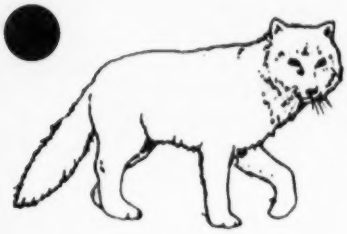
Evaluation

Place habitat signs around the room (labeled or with pictures depicting fresh water, salt water, soil, rock, grass, air). Give students the name of a plant or animal in the role play and have them stand by the appropriate habitat sign for that plant or animal.

Extension

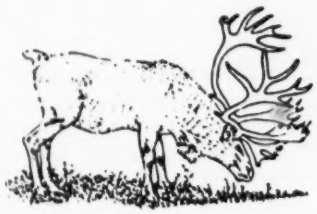
Create a wetland habitat mural. Have students draw plants and animals or trace them on butcher paper with an overhead projector from the role cards or wetland pictures. Students can cut them out and place them in the appropriate place on the mural.

WETLAND ROLE CARDS



Arctic Foxes run swiftly through the grasses to catch voles and lemmings. Foxes also like goose and other bird eggs, small or young birds, insects and even berries.

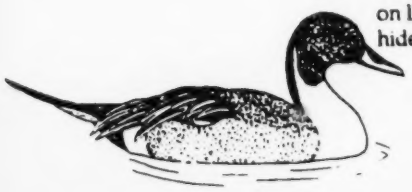
Arctic Foxes



Caribou have long legs for stepping through the watery tundra and for escaping from predators. Caribou eat lichens and plants.

Caribou

CUT LINE

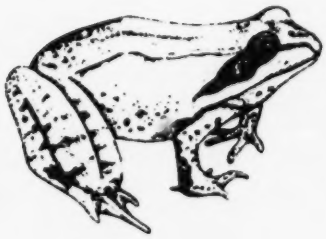


Ducks eat pondweed and insects. They nest in grasses or on little islands, where they can hide from predators.

Ducks

Fish swim in the abundant water in wetlands. They eat insects and other fish. When they're young, they hide among pondweeds.

Fish



Frogs eat insects, and sometimes are eaten by cranes and other birds and animals. Frogs try to escape their enemies by hopping or by swimming. Frogs have smooth skin and spend most of their lives in water.

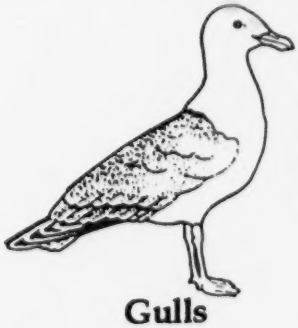
Frogs

Geese eat grasses, berries and insects. They nest among grasses or on little islands to hide from foxes, people and gulls.

Geese

Grasses grow with the help of the sun. Grasses have four parts: roots, stems, leaves, and flowers. Grasses make their own food, and serve as food for many animals. It may not seem that grasses move; but often when we look at wetlands, the only movement we see is the swaying of the grasses and other plants in the breeze.

Grasses



Gulls nest in grasses. They fly into the sky, screaming loudly, when their nests are approached by people, foxes, or other predators. Gulls eat fish, snails, decaying animals, bird eggs, and insects.

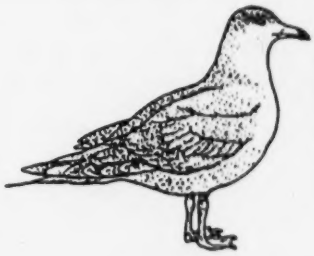
Gulls

WETLAND ROLE CARDS

Insects eat plants, or other insects, or decaying fish and other animals. Most insects are fast-moving whether they live in the water or in the air so they can escape from the many animals that like to eat them.

Insects

CUT LINE



Jaegers (yay-gers) nest in tundra areas, near lakes and ponds, and they steal food from other birds. During nesting, they prey on other birds, goose and other bird eggs, lemmings and insects.

Jaegers

Mink feed on goose and other bird eggs, goslings, frogs, mussels, and aquatic insects. They have long slender bodies and soft fur.

Mink

Moose have long legs for striding through water and for escaping from bears, wolves, and people. Moose eat pondweed and willow bushes.

Moose

Pondweed makes its own food under water with the help of the sun. It is eaten by many animals. Pondweed has flexible stems and leaves that sway with the water currents.

Pondweed

Sandhill Cranes are long-legged so they can wade through water and tall grasses as they hunt for plants, insects, fish, and voles. Sandhill cranes escape from enemies by running or flying.

Sandhill Cranes

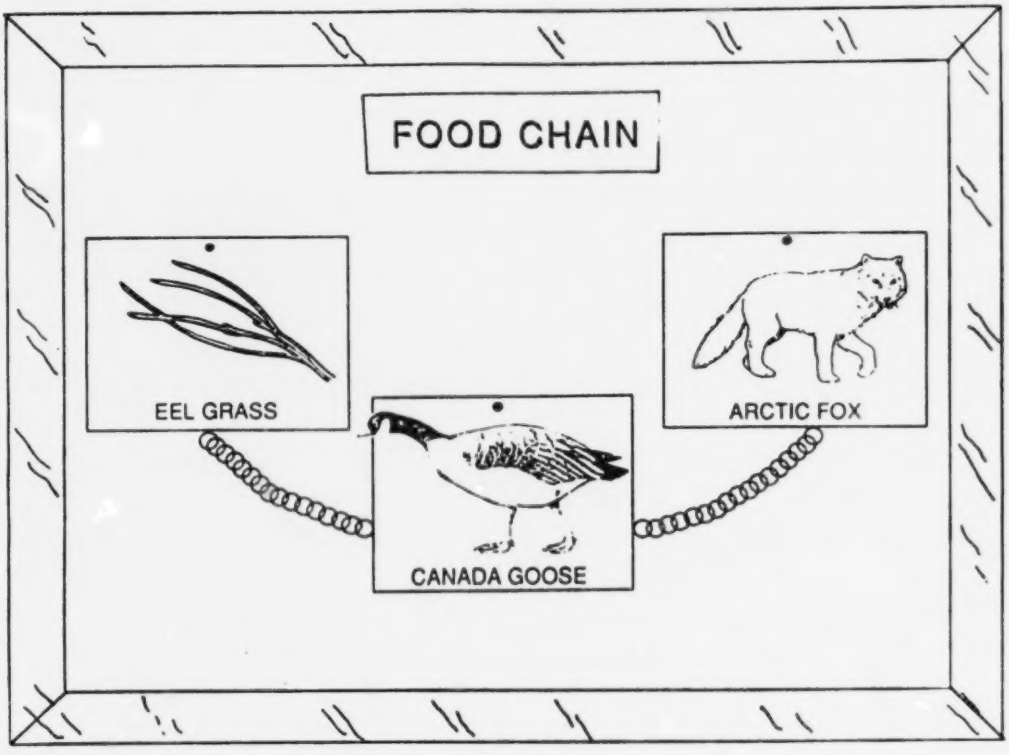
Snails eat plants and leftovers from the meals of other animals. They hide by moving so slowly that they are hardly noticeable.

Snails

Snowy Owls perch on the small wetland islands called hummocks, watching for the voles, mice and lemmings that they like to eat.

Snowy Owls

I'M NOT MEAN, JUST HUNGRY!



Objective

Students will understand that wetland animals depend on each other for food by putting a simple food chain in order.

Method

Students will be divided into four different groups at four different tables to color and cut out food chain sheets. Each group will decide in what order the animals should be placed according to who eats whom. Groups will trade food chain card sets and place them in the correct order.

Background

The transfer of energy from its source to one or more organisms is called a food chain. The sun's energy is the primary source of energy for all life on earth. Sun energy flows through many links in the plant and animal world. The plants and animals that depend on each other for food each form a link in the food chain. An example of a food chain might be: eelgrass is eaten by geese whose eggs are in turn eaten by gulls whose chicks are in turn eaten by foxes. (In reality, nature is not so simple. Food chains are really food webs, since many species are related to more than one food source and more than one predator.)

Materials

- group sets of the four Food Chain Sheets
- scissors
- coloring crayons

Subjects: science, art
Skills: cutting, drawing, analysis, group, cooperation, synthesis
Duration: one to two class sessions
Group size: four groups
Setting: classroom
Vocabulary: food chain, predator, prey
Topics: cycles, food chains, interdependence predator-prey relationships

Procedure

1. Before class, set up each of four tables with group copies of one of the Food Chain Sheets. Have enough pairs of scissors for each student in a group and have crayons available at each table.

2. Ask students what they ate for lunch or supper. What kinds of plants and animals do we depend on for food? Using a food example from a student response, choose students to role play a simple food chain. One example using salmon might be to have several students pretend to be a school of herring, have another student pretend to be a salmon catching and eating one of the herring and another student fishing and catching the salmon. Tell students that they will be learning about wetland animals that depend on each other for food.

3. Divide students into four groups and have them each take one sheet to their table. They will only be coloring and cutting one Food Chain Sheet. After they have completed that, they are to put the four cards in order of what eats what beginning with the plant (algae may need to be explained). See if everyone in the group can come up with the same answer and explain why.

4. Have groups trade sets of cards with other groups to put them in order until everyone has had all 4 sets. Discuss what might happen if one of the links in the chain was missing. Ask if animals depend on one another.

5. Discuss whether or not animals are bad or mean for killing and eating other animals. Why or why not? (Note to teacher: these questions were designed to encourage discussion, rather than to have "right" or "wrong" answers.)

Evaluation

Have each group act out one of the food chains to see if they can put them in the correct order.

Reference

Title "I'm Not Mean, Just Hungry" from a song by Billy B.

Extensions

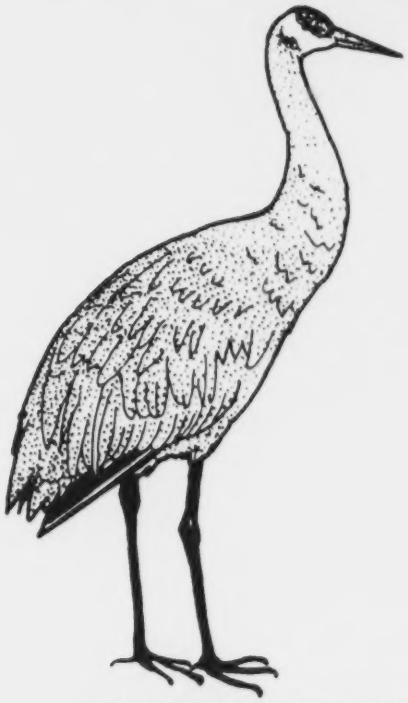
1. Create a bulletin board using food chain examples. Have students make paper chains to connect the different links.

2. Have students trace out the food chain and food web relationships on the "Energy Flow in an Alaska Wetland" poster.

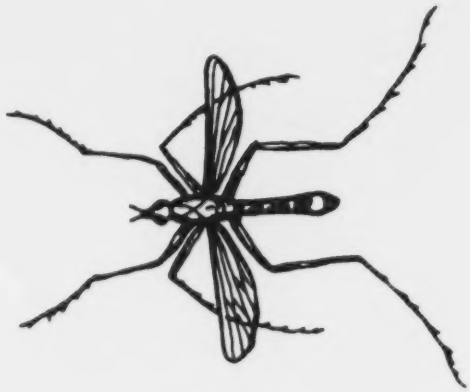
27

CUT ALONG
DASHED LINE

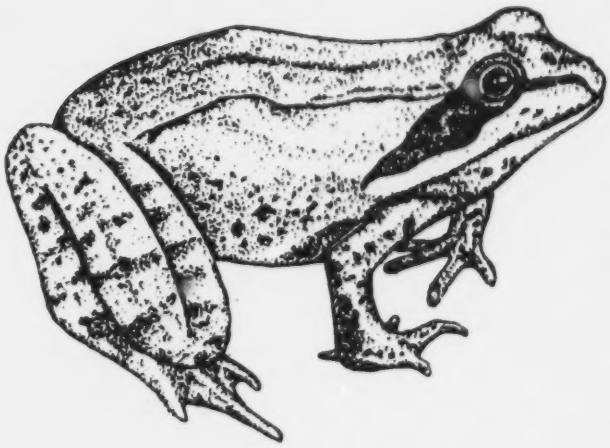
FOOD CHAIN



SANDHILL CRANE



MOSQUITO



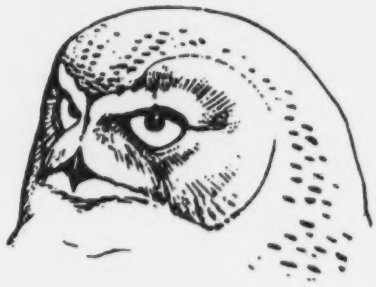
WOOD FROG

ALGAE

CUT ALONG
DASHED LINE

FOOD CHAIN

LEMMING



SNOWY OWL

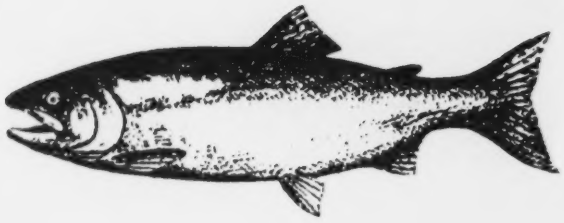
SEDGE

MINK

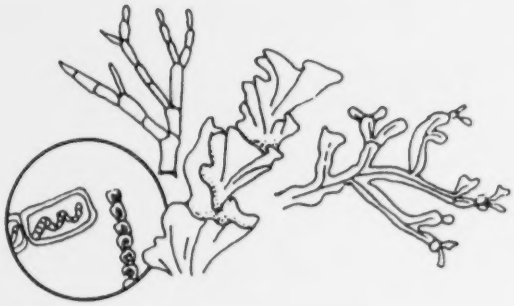
29

CUT ALONG
DASHED LINE

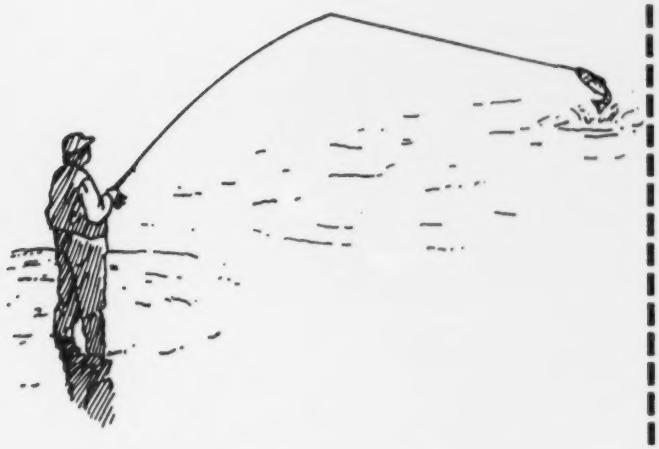
FOOD CHAIN



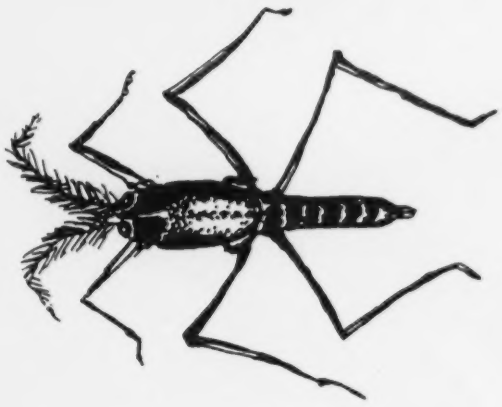
SALMON



ALGAE



PERSON



WATER STRIDER

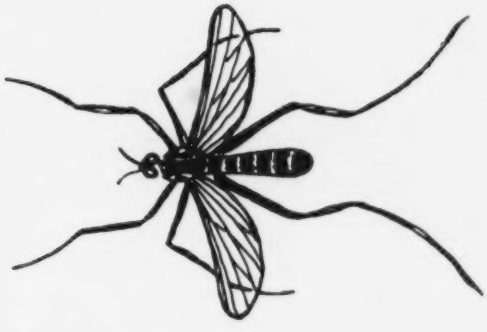
30

CUT ALONG
DASHED LINE

FOOD CHAIN

PINTAIL DUCK

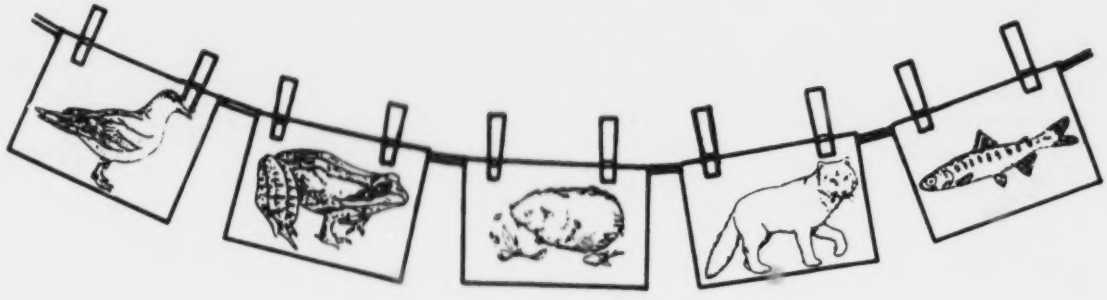
MINK



MIDGE

ARROW GRASS

MYSTERY ANIMAL



Objective

Students will develop a wetland animal "mystery story" that describes the animal's habitat as well as what it eats, how it sounds, how it moves, how it looks, and where it lives.

Method

Students will listen to a mystery animal description and then draw a picture of it in its habitat based on the descriptions in the story. Students will create their own mystery wetland plant or animal description based on the Wetlands Cards and their research.

Materials

- Mystery Animal Story
- Mystery Animal picture
- 4" x 6" index cards
- pencils
- heavy string
- clothespins
- Wetlands Cards
- materials for research: field guides, Alaska Wildlife Notebook Series, etc.

Procedure

1. Tell students that they are going to take a trip to see a very unusual animal. Students should listen very carefully and pay close attention to everything they "see" because they will have to create a "field report" on the animal and its environment afterwards. Read the Mystery Animal Story, or memorize it and give a dramatic presentation.

2. Pass out 4" x 6" index cards and have students draw a picture of the animal in its habitat for their field report. Allow a set amount of time—about 5 minutes. While they are drawing, tie a heavy string across the room. When students are finished, have them attach their pictures to the line with clothespins to display them for an informal "art exhibit."

3. After students have had a chance to look at the cards, ask f they would like to see a picture of the mystery animal. Show the Mystery Animal picture.

Subjects: science, language arts, art
Skills: analysis, classification, description, drawing, identification, listening, memory, reading, reporting, research, visualization, writing
Duration: 1-2 class periods
Group Size: whole group, individuals
Setting: classroom, outdoors
Topics: artistic expression, adaptation, classification of species, habitat for wildlife, identification of plants and animals, use of senses, wildlife diversity

4. Tell students that they will have the opportunity to write a description of a mystery animal that occurs in wetlands. They will look through the Wetlands Cards for an animal that they would like to describe. Mystery stories should include information about its habits and habitat: what it eats, how it sounds, how it moves, how it looks, where it lives, etc.

5. When students have completed their stories, have them attach the wildlife card on the string. Students can read their descriptions or memorize them and give a dramatic reading of their mystery animal. The class can try and guess which animal it is by looking at the pictures on the string.

Evaluation

Does the Mystery Animal Story fulfill the objective?

Reference

Cornell, Joseph. 1989. Sharing the Joy of Nature. Dawn Publications.

Extension

Have students complete the worksheet "Mystery Bird."

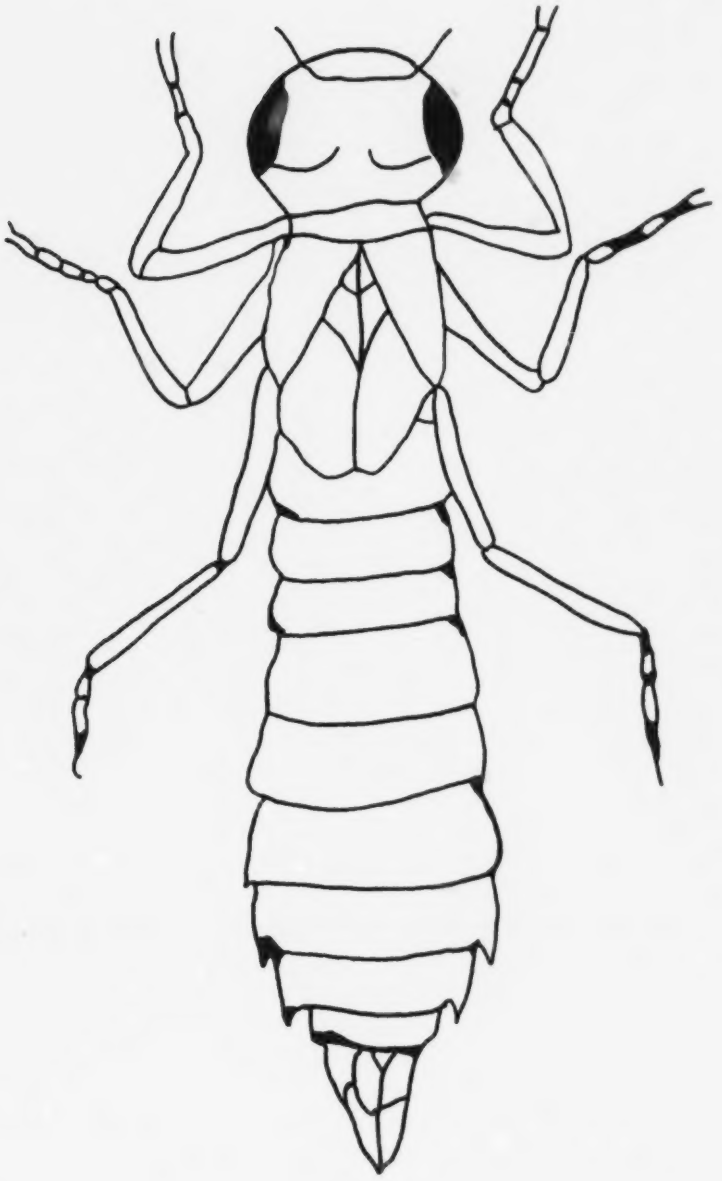
Mystery Animal Story

You are in a pond underwater looking for a creature. A school of small fish swims by the green water plants. A slight movement on the muddy bottom catches your eye. There it is! There is that brown creature. It is hard to see in the muddy bottom. It is moving very slowly with its six long legs. But the first thing you notice is its eyes. Look at those eyes! Those huge, dark, scary eyes that take up most of its head. The creature keeps creeping forward. You must squint to notice the two short wings lying flat on its back. As your eyes follow the rest of the body, you see that there are lines marking the different sections of its back. At the very end of its body it has two very short, sharp tips.

The creature keeps moving slowly through the mud. It has what looks like a mask. The mask covers its face almost up to its eyes. Suddenly, an arm leaps out of its face! No, it's not an arm. It is the lower jaw. Two claws make up the mask-like jaw. The jaw shoots out like an arm reaching out from the elbow. The claws grab a small mosquito larvae. The lower jaw snaps back into place. Its mouth easily chews up the soft body.

You wonder if you are seeing things, it all happened so fast! The school of fish comes by again. The creature is ready. With a fast flick of its lower jaw, one of the fish is gone. The rest of the school leaves quickly. They are frightened by the dark, scary water creature. The creature continues its slow hike through the mud in search of another fast food meal.

MYSTERY ANIMAL

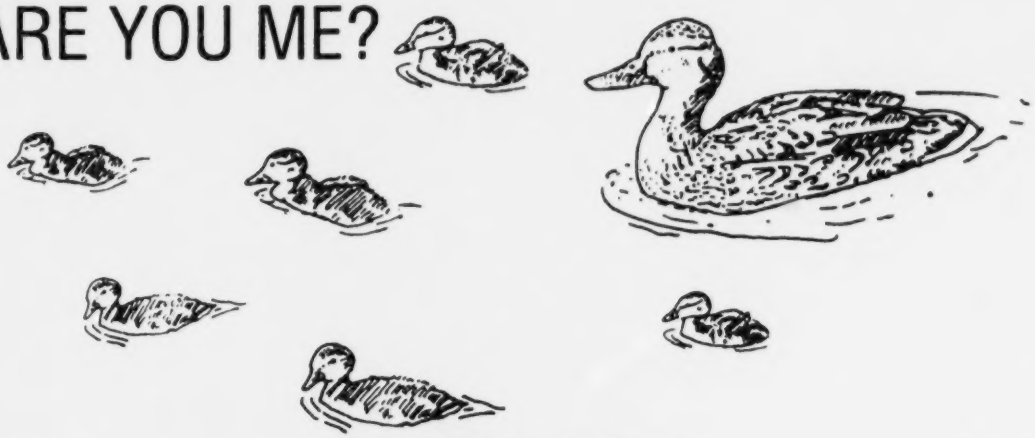


DRAGONFLY NYMPH

MYSTERY BIRD

These feet belong to an animal that lives in a wetland near you. Complete the picture. Be sure to add the animal's habitat.

ARE YOU ME?



Objective

Students will be able to recognize various young stages of aquatic animals and match them with corresponding adult stages.

Method

Using picture cards, students match pairs of juvenile and adult aquatic animals.

Background

Compared to adulthood, many animals look significantly different in their earliest stages of development. This is obviously true for some aquatic insects. Many aquatic insects undergo change during growth, or, **metamorphosis**. Some insects experience simple metamorphosis while others undergo complete metamorphosis. In simple metamorphosis, the insect egg hatches to produce a **nymph**. Insect nymphs have essentially all the features of adults. As they grow, they are visibly similar at each stage.

Insects that experience complete metamorphosis are characterized by eggs that hatch into **larvae**. One larva grows through several stages and then changes into a **pupa**. Pupae are usually encased in a protective cover for their next stage of growth. From the pupae emerge the soft-bodied, often pale-colored, insects. They differ remarkably in appearance from their earlier forms, but are not yet completely formed. Gradually the soft, pale body develops firmness and color. In complete metamorphosis, there is little resemblance between the adult and earlier forms.

There are also remarkable similarities and differences between other aquatic animals in different life stages. The eggs of many animals that hide their hatchlings, for example, may be the closest image of miniature dinosaurs to be found on the planet. Aquatic mammals often are easy to recognize. They frequently do not change as dramatically as some other animals in overall appearance as they grow from young to adult stages.

The major purpose of this activity is for students to recognize that there are differences in the life stages of aquatic animals as they grow. The students will increase their appreciation of the diversity of wildlife as well as their understanding of growth and change in animals.

Materials

- "Are You Me?" cards
- cardboard for making picture cards
- marking pens or crayons

Subjects: science
Skills: analysis, classification, communication, comparing similarities and differences, matching, recognition, small group work
Duration: one or two 20-minute periods, preparation time for students to bring family pictures to class
Group Size: small groups of three or four students each
Setting: indoors
Vocabulary: nymph, larvae, pupa, metamorphosis
Topics: metamorphosis, development

Procedure

1. Make pairs of aquatic animal cards. The animals in the pair should be the same kind. For example, one might be a pair of beavers; another might be a pair of pelicans. One animal in the pair should be an adult; the other should be at a younger stage of development. The pairs might include adult, larval, nymph, hatchling, juvenile infant and/or egg forms of aquatic animals. You may use the masters provided.

2. Have some students bring two pictures from home. One should be of an adult, the other should be a picture of a child. The pictures should be pictures of the same person as an adult and as a child. For example, the pair may be of the student's parent as an adult and in a childhood picture, or it may be a school picture of the student and a picture of the student as an infant.

3. Divide the class into small groups of three or four students each. Assign each group a single table or station. Ask them to stand in a circle around that station. Have them hold their own set of paired pictures in their hands.

4. Have the students at each station place their pairs of pictures on the table and mix them randomly. Once the adult-child pictures are mixed at each table, have the entire group shift to another table, so there will not be anyone at the tables where their own pictures are placed.

5. At the new table, have the group attempt to match pairs of adult/child or student and infant photos.

6. When the students at each table have completed their efforts to match the pairs, ask all of the groups to return to their original tables—the place where they left their own pairs of pictures. Are the matches correct? Ask the students to change any pairs that are not correctly matched. Talk about how difficult or easy it was to correctly match pairs. Introduce the idea that many animals look remarkably different as adults than they appeared in younger forms. Tell the students that they are about to learn how to match young and adult forms of many different kinds of aquatic animals.

7. Introduce the aquatic animal cards and divide the class in half. Designate one half of the students "adults" and the other half "young animals." Give each student in the "adult group" an "adult" animal image. Give each student in the "young animal" group a young animal image. Make sure there is a corresponding match, adult or juvenile, for each card given. Instruct the students to look for their "match"—pairing the appropriate adult and juvenile forms. Note: You can attach each animal card to a string loop so the pictures can be hung around the students' necks as they try to match the pictures.

8. When all the students have made their choices and think they have a match, let everyone help to see if the matches are correct. Some are more difficult than others and may be confusing. You may show the students the matched images on the master.

9. Have all of the students look at all of the correctly matched pairs. Look at similarities and differences in how different kinds of aquatic animals grow and change. Note: This activity can be repeated several times by shuffling the adult and young images and passing them to new "animals" so that each student becomes familiar with a wider array of animals.

Evaluation

Pick two aquatic animals. Draw a picture of each animal as an adult, and another picture of each animal as it looks when it is younger.

Reference

Aquatic Project WILD. 1987. "Are You Me?". Western Regional Environmental Education Council.

Extensions

1. Find out as much as possible about some of the habitats in which these animals live.

2. If possible, visit some of the habitats where the animals are actually found.

3. Pick a pair of images and find out more about the life cycles of the animals shown.

4. Discuss and/or pantomime the concept of metamorphosis.

5. For an art activity, make dragonfly nymph masks.

BEAVER

DRAGONFLY

CADDISFLY

WHIRLIGIG BEETLE

YOUNG BEAVER

DRAGONFLY NYMPH

CADDISFLY LARVAE

WHIRLIGIG LARVAE

ARE YOU ME?

MOSQUITO

BLACK FLY

CRANEFLY

OSPREY

34 BEST COPY AVAILABLE

WOOD FROG

DUCK

BUTTERFLY

MAYFLY

TAD POLES

DUCKLINGS

BUTTERFLY LARVAE

MAYFLY NYMPH

ARE YOU ME?

DRAGONFLY NYMPH MASK

EYES
Color, Cut &
Paste on Plate

STAPLE
PIPE CLEANERS
FOR ANTENNA

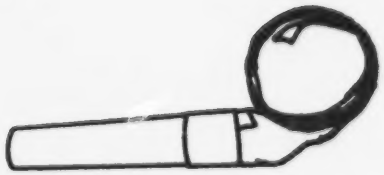
CUT
OUT

CUT
OUT

HEAD
Paper Plate

CUT
OUT

INSERT
PARTY BLOWER



44

ADAPTATIONS

Goose (Wings)

Objectives

Students will:
1. Demonstrate how birds are adapted to survive in their environment.

2. Understand the concept of adaptation as a survival mechanism.

Method

Students will learn more about bird species by studying ways birds and other animals are adapted to their environments.

Background

Each organism has developed physical and behavioral **adaptations** so that it is better suited to its particular environment. These adaptations allow species to outcompete other species for survival needs. For example, eagles have talons for catching fish, large wings for soaring, sharp eyes for seeing at great distances and a beak for tearing. This gives each type of animal a special place (a **niche**) in its part of the world that is not occupied by other species.

Materials

- two balloons
- sink or tub of water
- strips of paper one inch by three inches long for each student

Procedure

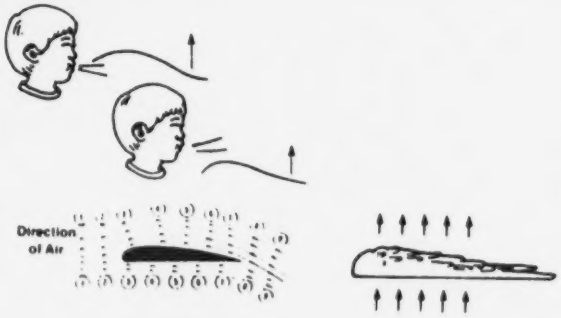
1. How do birds fly?

Birds move through the air by pulling themselves forward like a person rowing a boat. They push the air down and back with the broad side of the wing, then slightly turn and fold the wing to move it forward. To help children understand how birds fly, have them stand up and move their arms the way a bird moves its wings. Raise arms high behind the head, palms facing forward. Then, pull arms forward, down and to the sides. Turn wrists so that palms are facing forward. Lift arms at sides to the original position, ready for the next stroke. Practice a few times to get the feeling of how a bird flies.

As a bird pulls down with its wings, it pushes air away from its front. Ask students if they can feel a little

Subjects: life science, art, physical education
Skills: analysis, classification, comparing similarities and differences, description, discussion, drawing conclusions, evaluation, interpreting data, visualization
Duration: one class session
Group Size: whole class
Setting: indoors
Vocabulary: adaptation, niche
Topics: adaptation, survival needs of wildlife, camouflage, habitat for wildlife, predator/prey relationships, wildlife diversity

breeze as air is pushed in front of them. Air moving upward, against the underside of a bird's wings, keeps the bird up in the air. Try an experiment to understand how this works.



Have students cut slips of paper one inch wide and three inches long. Hold the narrow end of the paper near the lips and blow. The other end of the paper should move upward. The strip of paper is the same shape that an airplane wing or a bird's wing is in cross-section.

Describe other adaptations that allow birds to fly. The bodies of most birds are streamlined. Like an airplane, they are shaped to move through air smoothly. Most birds have light bones, leaving plenty of room for muscles and feathers and having less weight to lift. Wings are often high on the chest, and chest muscles are strong. Bird bills are lighter and more streamlined than the heavy jaws of mammals. The next time you eat a bird, look at its hollow bones.

A bird steers by moving each wing at a different speed, and also by tilting its body and moving its tail feathers.

2. See how buoyancy (air) sacs inside a bird can help it float. Get two balloons and fill only one with air. Put both balloons in water and try to push them under. The balloon with air is hard to sink, like a bird with its air sacs filled. The other goes under easily, like a duck without air sacs.

Evaluation

Can students explain what an adaptation is?

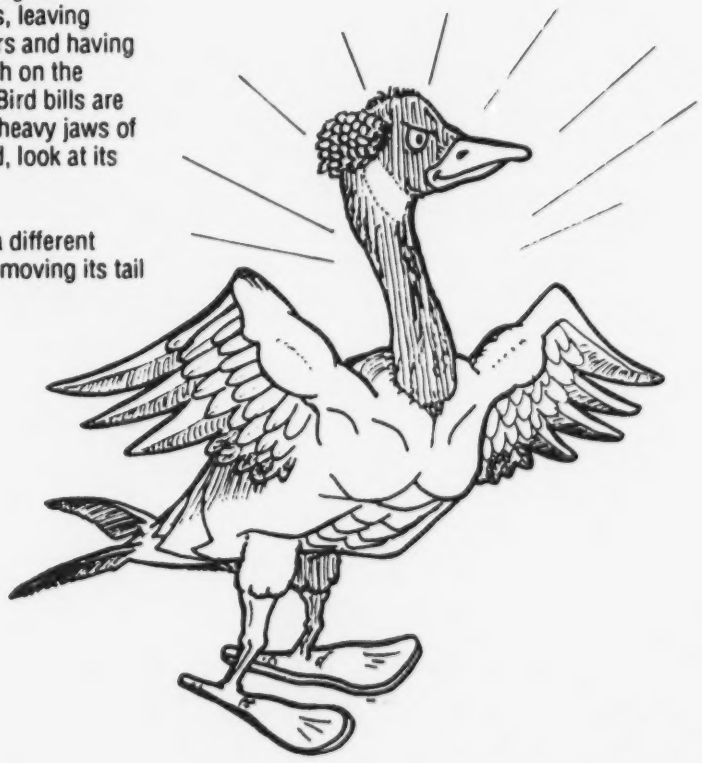
Can students give examples of adaptations and explain the advantages it gives the animals? How do the adaptations affect how the animal lives? How the animal looks?

References

Project WILD. 1986. "No Water Off a Duck's Back". Western Regional Environmental Education Council.

Project WILD. 1986. "Adaptation Artistry". Western Regional Environmental Education Council.

Goldin, Augusta. 1989. Ducks Don't Get Wet. Trophy's Let's-Read-and-Find-Out Book.



Extensions

1. Do the Project WILD activity "No Water Off a Duck's Back" to see how waterfowl preen feathers with oil to repel water and what happens when this process is disturbed by pollutants. Try to find the book Ducks Don't Get Wet in your library for younger students.

2. Students could design an animal for a specific niche and then explain what adaptations it should have to fill that niche. Use the problems wetland animals must solve (See the Appendix in Teacher Information Manual Part I) to describe niche requirements. These may be realistic or imaginary creatures. (The Project WILD activity "Adaptation Artistry" provides more information on this activity.) Use crayons to draw the animal, or create a 3-dimensional creature from modelling clay, construction paper, pipe cleaners, etc.

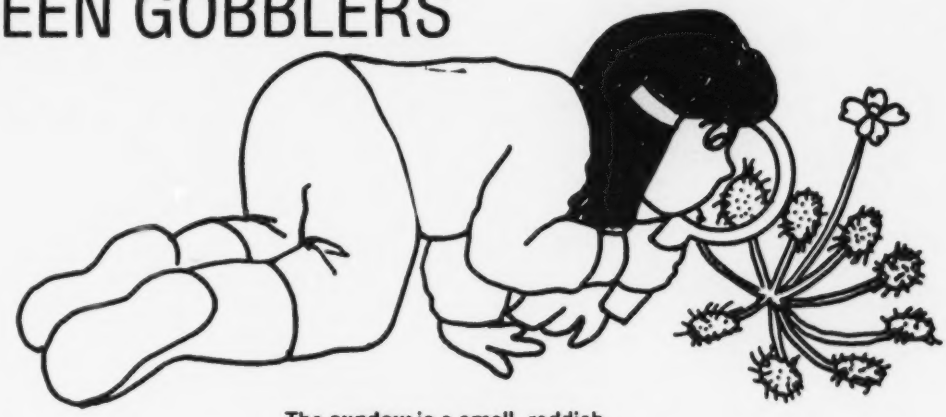
3. Bring in skulls of animals to see how the teeth match the type of food the animals eat. Bring in bones or wings to see the hollow bones and to compare the strength of the bones. Dissect a bird wing and compare the bones of the wing to the bones in a human hand.

4. Have students research the purposes of the following wetland adaptations (or others in the Appendix in Teacher Information Manual Part I): webbed feet for waterbirds, large number of eggs laid by a goose or duck, strong, hooked bill on an eagle, long tongue of a wood frog, fish gills, beaver's broad tail.

Answers:

1. Webbed Feet - webs increase the surface area of the feet and provide greater propulsion through water
2. Large Number of Eggs - better chance some young will survive
3. Eagle's hooked bill - strong, hooked bill for tearing meat
4. Long tongue of wood frog - used to catch insects for food
5. Fish gills - used for breathing in water
6. Broad tail of beaver - used for balance, swimming, and danger warning

GREEN GOBBLERS



Objectives

Students will:
1. State the definition of a carnivore.

2. Distinguish among three carnivorous plants.

Method

Students will learn about and name different types of carnivores. Volunteers will demonstrate how three types of carnivorous plants catch and eat their prey. Students will work in groups to devise one type of carnivorous plant and show how it captures insects.

Background

A **carnivore** is a meat-eater. Most people think of animals as meat-eaters but wetland areas hold a few fascinating exceptions. In acidic waters, plants cannot get all the nutrients they need. Thus, they have developed special adaptations to gain these additional nutrients. One intriguing adaptation of wetland plants is to capture and digest insects. Each of three carnivorous plants in Alaska (sundew, butterwort, and bladderwort) has its own unique technique.

The **sundew** is a small, reddish plant with sticky droplets on the leaves that curl up if touched, much like a sea anemone. If an insect happens onto a leaf, it's immediately stuck fast and the plant begins to absorb it. The **butterwort** looks much like a violet with a thick, greasy coating on its leaves that makes them look as if they'd been buttered. Insects that land on the leaves get stuck, and the plant absorbs everything but the hard, outer shell. Finally, the **bladderwort** is an underwater plant that appears to be suspended by small floats or bladders. Normally the bladders are collapsed, but should an insect brush by a hair near the bladder's opening, a trapdoor flies open with a rush of water that sweeps the insect inside. Now the bladder is inflated like a balloon, and the insect is trapped, to be digested slowly. The trap, which works in a fraction of a second, is the fastest trap known to plants. (See the article "Insects Beware!", in the March-April 1990, Alaska Fish and Game magazine for more details about these plants.)

Materials

- box of materials: velcro, cotton swabs, pipe cleaners, construction paper, tape, glue, scissors, foam balls, paper clips, socks, etc.

Subjects: science, drama, art
Skills: classification, role playing, designing
Duration: 1-2 class sessions
Group Size: whole class and small groups
Setting: classroom or outdoors
Vocabulary: carnivore, carnivorous, sundew, butterwort, bladderwort
Topics: adaptation, classification of species, survival needs of wildlife, wildlife diversity

- carnivorous plant illustrations

Procedure

1. Ask students if they know what a carnivore is. Explain that a carnivore is a meat-eater. Have students name living things that are carnivores. Ask students if plants can be carnivores. Tell them that in special wetland areas there are plants that trap and eat insects. See if students can describe what a carnivorous plant might look like.

2. Explain that there are 3 types of carnivorous plants in Alaska: sundew, butterwort, and bladderwort. While you are describing each plant, choose several students to model each—one can be the plant stalk, one can hold out his/her arms for leaves, one can be the insect, etc.

3. Divide students into pairs or groups of three. Have them devise one type of carnivorous plant using the materials box. Each group will then present and demonstrate their plant—the other students may guess which one it is to represent.

Evaluation

Can students define carnivore? Are the plants accurately represented? Are student guesses correct?

Reference

Alaska Fish and Game Magazine, March-April 1990. "Insects Beware!". Alaska Department of Fish and Game.

Extensions

1. Students can develop a play or write a story from the viewpoint of a carnivorous plant or an insect being digested by one.

2. Students can develop an imaginary carnivorous plant and write about what it looks like, what it eats, where it lives, etc.

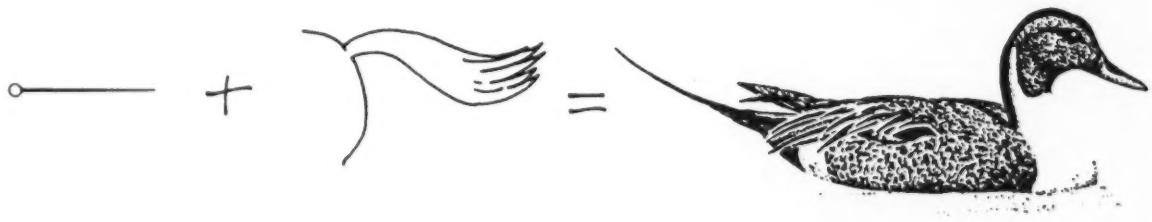
CARNIVOROUS PLANTS

SUNDEW

BUTTERWORT

BLADDERWORT

WHAT'S IN A NAME



Objectives

Students will:

1. Compare the information conveyed by various bird names in different languages.

2. Appreciate cultural diversity in relation to the environment.

Method

Students will read different names and create their own to describe birds or some aspect of their ecology.

Background

People use names of animals in order to distinguish among all possible animals and communicate to others. To avoid endless confusion, scientists have developed a worldwide system for naming each animal by a genus and species name in Latin and these names have been standardized by matching specimens in museums to correct names. **Ornithologists**, the scientists who study birds, have also developed a system to determine the correct "common name" in English for each bird species in America. But other common names still persist and people have traditionally named the animals around them in their native language. The common names, Latin names, and Alaska's Native languages all contain a wealth of information about animals based on the observations people have made. Each name is an attempt to characterize the animal in a way that other people will recognize. The name may convey information about the animal's appearance, its behavior, the sounds it makes, or ecological information about its relationships to other animals or to its environment.

This activity is designed to introduce your students to the different names of birds in Alaskan wetlands and some of the different reasons why the same bird may have several different names. You can make this activity more relevant by having your students find out the names (and translations into English) for these animals in the Alaska Native language of your area or other languages by interviews with people in your community.

This activity can be used in a bilingual or multicultural setting to reinforce the richness of detail and information provided by a diversity of viewpoints and cultures.

Materials

- bird field guides or color pictures of birds
- Bird Name table

Subjects: language arts, science, bilingual studies
Skills: analysis, classification, comparing similarities and differences, observation, identification, translation
Duration: one class period
Group Size: 4-6 students
Setting: indoors
Vocabulary: various bird names
Topics: communication, community (humans and wildlife), identification of plants and animals, value of wildlife to people

Procedure

1. Use a bird field guide to look up the current common names of birds. Show your students pictures of birds with descriptive common names (e.g., golden plover, red-necked grebe, dipper). Ask them to describe the bird without naming them. Then, ask them or tell them the name of the bird. Compare the name with other words they used to describe the bird. Point out that the name included only part of the description but focused on a prominent characteristic such as color.

2. Ask your students why they think an animal could have more than one name (people notice different things, people who see the same bird may live in different countries or speak different languages, people may be describing something about the animal's habits that's important for other people to know).

3. Brainstorm what type of information about an animal could be conveyed by its name. Tell them they will find out by comparing different names for some animals found in Alaskan wetlands as named by different Alaska Native groups and by scientists.

4. Give your students examples of English and Native bird names from the Bird Name sheet. Include other Alaska Native names or names from other ethnic groups in your area, if possible.

5. Discuss the different types of information conveyed by the different types of names. Discuss why people would make different types of observations of the same animal. (e.g., Native people were dependent on some animals for food and did not have a written language so it was more important to describe them more fully to others when talking, common names given by scientists often included the names of scientists.)

6. Divide the class into small groups of 4-6 students. Have the groups create new names for birds from color pictures or bird field guides. Tell them the names or phrases must be distinct enough so the animals cannot be confused with any other.

7. After the groups have finished, have each group tell the other students one of the names they have created. The other students will then guess which of the animals they have renamed.

Evaluation

Have students identify several different types of information conveyed by names in different languages. Were the invented names descriptive enough for other students to guess them?

References

Nelson, R.K. 1983. Make Prayers to the Raven. University of Chicago Press.

Randles, P. Telephone conv. w. author. 1990.

Marks, P. Telephone conv. w. author. 1990.

Extensions

1. Research the local names for birds in your area. Find out the names in the Alaskan Native language of your area and their translations. If you have students who speak a foreign language in their home, ask them to bring back a list of the names of the animals in that language and the translations.

2. Give the students examples of bird names that sound like the sound the bird makes: killdeer (English), willet (English), curlew (English), tuutangayiit (Yup'ik name for the cackling Canada goose), neqlernat (Yup'ik name for the black brant). Play a tape of bird calls (see Resources section of the Teacher Information Manual) and have the students make up names that sound like the call.

3. Research Native American cultures who named people after animals and their habitat. Find names of people who were named after birds.

Bird Name Table

COMMON NAME	ALASKA NATIVE NAME	ALASKA NATIVE LANGUAGE
1. Horned Grebe	**toqa' vichidi** "red-necked grebe's younger brother"	Ingalik Athabaskan
2. White-fronted Goose	**K'idot'aa-gga'** "bare-beak" ref	Koyukon Athabaskan
3. Mallard Derived from old French, it refers to "maleness".	**Keenaadachuh** "flies straight up in the air"	Tlingit
4. Scaup Refers to birds that feed on "scamps" or "scalps" (an early name for scallops).	**tontseedla** "stays in water"	Koyukon Athabaskan
5. Harlequin Duck A "harlequin" is the name of a character in old Italian comedies who wore a mask and colorful tights.	**taa'sa hut'aana** "lives in whitefish lakes"	Koyukon Athabaskan Ingalik Athabaskan
6. Bald Eagle The white head of this eagle appeared bald.	**ch'aak** imitates the sound made	Tlingit
7. Ptarmigan	**dibaaga** imitates sound made by willow ptarmigan	Koyukon Athabaskan
8. Lesser Golden Plover	**bibidisis** "bear belly"	Koyukon Athabaskan
9. Yellowlegs	**dzoinolga** "long legs"	Koyukon Athabaskan
10. Bonaparte's Gull Charles Bonaparte, Napoleon's younger brother, was an American ornithologist.	**Veelzina** "black head"	Koyukon Athabaskan
	vilthelzring "his head is black"	Ingalik Athabaskan

WETLAND RHYMES

MY FOOTSTEPS ARE HEAVY,
MY SHOULDERS ARE WIDE;
I WALK THE WIDE TUNDRA
WITH A SLOW ROLLING
STRIDE.
MY CUBS PRACTICE FISHING
AND HUNTING FOR FUN,
THEY ROLL AND PLAY ALL
SUMMER UNDER THE MID-
NIGHT SUN.

Objective

Students will identify wetland animals by their physical and behavioral differences.

Method

Students will accurately color the animals in a stream and river corridor illustration using field guides and posters. The teacher will read rhymes about each animal while the students try to choose which animal the rhyme describes.

Background

Wetlands occur in areas flooded by streams and rivers.

Materials

- River and Stream Corridors coloring page - class copies
- crayons
- bird, mammal, insect, fish field guides

Procedure

1. Hand out the River and Stream Corridors coloring page to each student. Instruct students to color each animal in the picture using the materials provided. Encourage students to color accurately because they might have to identify them by their color or markings later.

2. As students color, encourage discussion about the habits of the different animals—how they eat, sleep, nest, move, etc. Try to have students talk about what they already know about each of them.

3. When students have completed coloring, ask them to look at their sheets and listen carefully while you read different rhymes. Have them point to the animal that they think you are describing in each rhyme. After each rhyme, they may guess which one they think it is.

4. Ask students if they learned anything new about any of the animals. Which ones have they seen before? Which one is their favorite and why?

Evaluation

Could students identify the animals?

Extension

Have students make up their own rhymes for different wetland plants or animals.

Subjects: science, language arts
Skills: application, classification, comparing similarities and differences, drawing, identification, listening, observation, visualization
Duration: 1 class period
Group Size: whole class
Setting: classroom or outdoors
Vocabulary: animal, wetland, rhyme
Topics: habitat for wildlife, identification of plants and animals

Wetland Rhymes

The riddle can include a line that ends in a word that rhymes with the animal name or clue. Some examples:

My name rhymes with loose
You see me on the wing
I'm here in the spring
I'm an Aleutian Canada (goose)

My name rhymes with sea gull,
but I am more regal.
Dead fish are my dish.
Who am I? (bald eagle)

Predators want me to stay,
but I run away.
What am I? (prey)

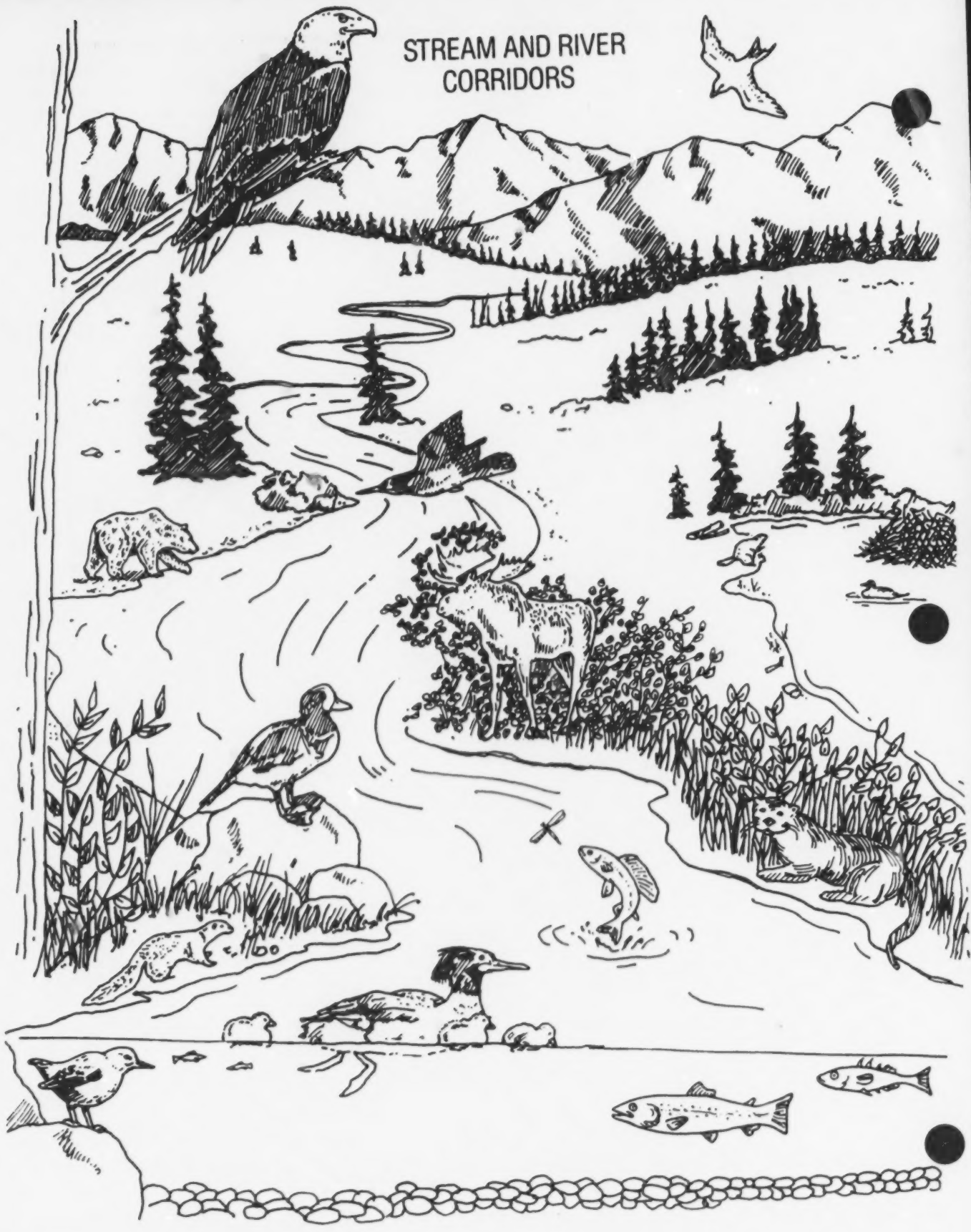
They can be also riddles that rhyme but don't provide a rhyming clue. Some examples:

My legs are quite lanky, my hooves are so shiny,
My fur-covered body is anything but tiny,
My most favorite food is a willow you can see,
And most of you've met the likes of me. (moose)

I soar through the air and I search for my prey,
My wingspan 8 feet as I swoop toward the bay,
A tasty small fish is what I have found,
I cry a high screech as I fly heavenbound. (eagle)

I came from an egg in the gravel below,
I'm still very little, but I'll grow and I'll grow,
I'll turn bright and silver and head out to sea,
But then I'll come back to make fish just like me. (salmon)

I am a house builder that has hard, sharp teeth,
I chew on tall trees that I move with webbed feet,
When startled or mad my tail starts to flap,
When it hits the clear water, you hear a loud slap! (beaver)



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EXPERIENCING A WETLAND

Objectives

Students will:
1. Become better observers.

2. Learn about wetland animals and plants.

Method

Students will learn about wetlands by taking a field trip.

Background

Wetlands are fun places for children to explore because they have an abundance of childhood favorites: water and animals. Experiencing a wetland firsthand is an excellent opportunity for students to learn by using all their senses. For more information on wetland creatures, see the activity "Wetland Homes."

Ponds and streams—areas with associated marsh wetlands—are found in or near most Alaskan communities. Bogs or other kinds of wetland areas may also be nearby. Both ponds and streams yield rich, (though different), fauna. Ponds are sometimes easier for young students to approach. On the other hand, many small streams are only a few inches deep. When picking a field trip water site, consider its accessibility (repeated short trips are preferable to a single visit), depth, the steepness of the river's bank, the room children will have to explore, and the area's animal diversity. Not finding animals is discouraging; to ensure student success, choose an area with a diversity of plants and insects. An area with a diversity of freshwater systems—ponds, streams, muddy bottoms, varying currents, and vegetation—will yield the greatest variety of invertebrates.

Subjects: science, environmental studies, physical education
Skills: observation, cooperation, respect for the environment
Duration: activity #1: one to five class periods
activity #2: one to two class periods
activities #3 and #4: one to three class periods
Group Size: 5 to 30 students
Setting: indoors and outdoors
Vocabulary: surface, shore, open water, bottom, dredge, plankton, rules, etiquette, observe, senses, similarities, differences, current

Materials

See individual activities for material lists.

Procedure

1. Select a local wetland for a field trip. Try a slough, pond, or bog near your school if one is available, or go to a nearby marsh. If a wetland is within walking distance, consider planning short trips rather than one long one.

2. Plan your field trips. Decide on locations, times, and means of transportation. Arrange to take parents, older students, or resource people as helpers. The most successful trips usually have one adult per five or fewer students. Biologists, long-time residents, parents, or bilingual staff in your school district may have field trip suggestions. Invite one or more of these resource people to go along. Usually, they are more than happy to oblige.

Write a letter to parents. Include requests for field trip assistants, resources, ideas, and permission slips.

If at all possible, visit the field trip site ahead of time with your assistants. Explain what you'll be doing and answer questions. (Older students make great helpers, as do parents and interested community members.) Field trips generally work best if you can divide your students into groups of five or six.

3. Prepare your students ahead of time. You might want to familiarize yourself with wetland birds, animals, and plants before going into the field. Be sure the children can identify the species they may encounter. It also helps to work with students' observation skills: bring a pet animal or house plant into class and let them practice. How many parts does the plant or animal have? What does the plant or animal feel like? What else can they tell you about it?

4. Promote conservation: the protection and wise use of natural resources. Ask children how they can help take care of animals and plants they encounter in their field and classroom studies. Through their concern for life and habitat, have students develop some rules. How can they keep from disturbing wetland homes? Here are some suggestions: step softly and quietly while observing animals, replace rocks or logs after looking underneath (to keep the roofs on the animal's homes), handle animals gently, fill in holes after looking for worms or clams (to prevent suffocation of the animals next door), and don't take live animals or plants away from their homes.

So that other children can enjoy the area, too, it is a good idea to discourage personal collections of any natural items, living or nonliving. Limit collections to educational purposes such as art projects or aquarium study—and return any living animal to their natural habitats as soon as possible. For classroom specimens, preserve only those animals already dead.

Encourage students to leave the beach, river, or wetland cleaner than when they arrived.

Review "Etiquette for Wildlife Watchers" with the students. You could have groups of students act out etiquette violations, for example, and have the rest of the class guess the rule.

5. Review safety with the children. Here are a few suggestions: stay together, have a buddy. If you become lost, stay right where you are and call out periodically. Make sure students dress warmly and keep dry. Discuss hypothermia. Take extra clothes and rain gear (plastic trash bags will do in a pinch).

Stay a safe distance from the water. In wetlands, because the ground is so mushy, sometimes you can get stuck. Step carefully. Wear life jackets on boat trips.

Don't taste anything without adult supervision. Some wetlands contain poisonous plants, and some people are allergic to plants that normally are harmless.

Carry a first aid kit.

6. Wetland and Field Trip Activities: develop a field trip outline. You may wish to include:

A. Discovery and exploration time. For your first trip you may want to spend the entire time simply discovering rather than in organized activities.

B. Structured learning activities. Wetland Task Cards (see Field Trip Manual in your school library) can be used for group activities or can be given to volunteer leaders for small group exploration. Make Task Cards by copying the Task Cards in this guide, pasting on squares of heavy paper and laminating. The task cards will help guide students in their habitat investigations. Students can work through them either individually or in

small groups (with the aid of chaperones). Chaperones distribute tasks and explain them to students, who trade completed task cards for new ones.

C. Snack Time.

D. Organized games, treasure hunts, and litter pickup. Outdoor activities or games in this curriculum may be used on field trips.

E. Review (which can be as simple as having each student and parent telling what he or she enjoyed most).

F. Make equipment for specific tasks. (See Field Trip Manual in your school library.)

Enjoy the field trip with your students. It should be one of the highlights of your school year!

Pre-Trip Activity

A. Before students arrive, place 10 to 20 items randomly on a table. Have the students come to the table to pick up an assignment or homework. Don't mention the other items on the table. After all the students have seen the items, cover the table with the butcher paper or table cloth.

B. Introduce the word "observe" by asking your class to define it. Observing includes looking closely, but also involves other senses besides sight. Tell students that in order to have a successful field trip, they will need to be good observers. Ask the students if they remember seeing anything on the table when they picked up their papers. Have the students make a list of the items they can remember. Make one large list on the board. Uncover the table. How many objects were there? Can students remember details about the school? Their homes? Sometimes the things we see everyday are the things we notice least.

C. Announce your field trip intentions and ask students what they think they will find. List the students' responses on the board and add some of your own to include all components of the pond system. (Items in the list might include willows, water lilies, dragonfly nymphs and adults, caddisfly larvae, mosquito larvae and adults, water striders, water, sand, mud, etc.)

D. Draw a cross-section outline of the wetland on the board. Have students draw pictures of the listed components and then place them on the cross section where they think they will find them on their field trip. Mud, sand, or rocks can be drawn right into the outline. Point out habitat divisions: surface, shore, open water, and bottom.

E. Have each student make a "Wetland Book" using blank sheets of paper folded and stapled to make a book. Students can design their own covers. This will be used to record observations made when doing the "Wetland Task Cards."

F. Practice the field trip. The day before the actual trip, have students bring appropriate clothes and gear. On the playground, simulate the field trip to familiarize students with equipment and Wetland Book Task Cards.

Reference

Alaska Sea/River Week, Volume 1. 1983. "Discovery." Univ. of Alaska. Alaska Sea Grant.

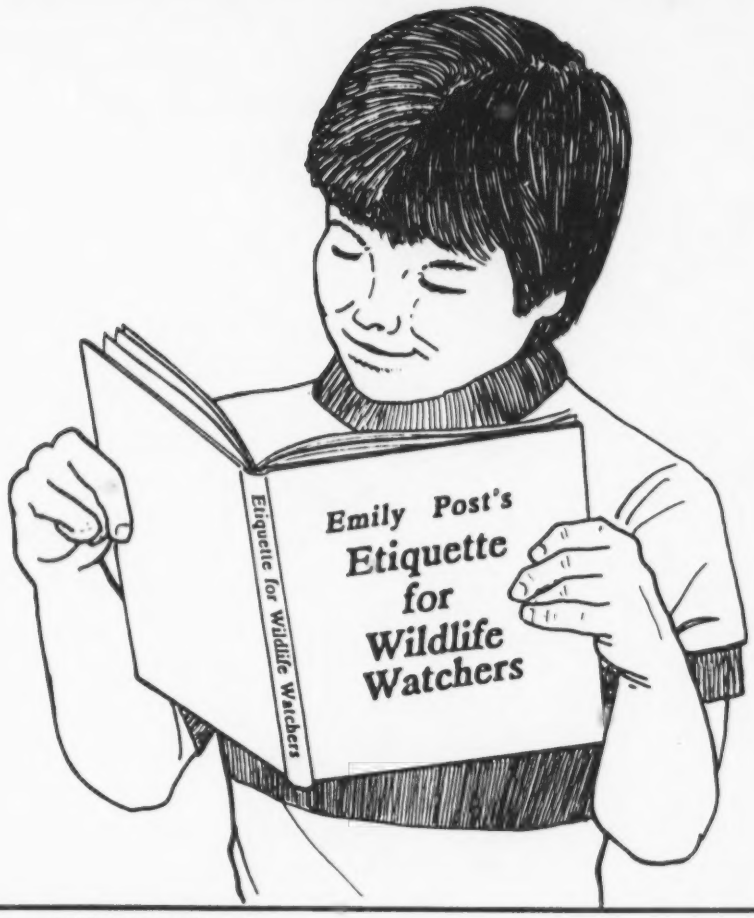
Extensions

1. In your School and Community:

Celebrate wetlands by using activities from this guide and the Alaska Sea/River Week materials as a model. Involve all students, teachers, and community members so that everyone works together. The whole school can be decorated with wetlands art; one class can inspire another; older students can do programs for younger ones and vice versa; community residents can help with field trips, speakers, and a meal prepared from edible wetland plants. An air of excitement spreads throughout the halls and classrooms! Don't hesitate to try a celebration on your own or with a few other teachers. By next year, when they've had a chance to see what you've done, others will want to join your celebration!

Plan your celebration at a time best suiting your location, for example, when the birds return to your area in the spring, when the salmon are running in the rivers, or when the berries are ripe. In coastal areas, teachers may find it best to consult tide tables and plan field trips at low tide. Use the Alaska Sea/River Week materials for reference.

2. Have the students complete the sheets "Tracks With Kids," "Wetland Bingo," "Wetlands Word Search," "Osprey Worksheet," and "Wetlands Hide and Seek."



Etiquette For Wildlife Watchers

Reprinted with permission from Alaska Department of Fish and Game "Viewing Alaskan Wildlife"

Most bird watchers, wildlife photographers, artists, tourists, sportsmen, and others who enjoy seeing wildlife are conservationists. They help wildlife populations and habitats by supporting conservation programs and by sharing their concern and appreciation for wildlife with other people. Unintentionally, however, wildlife watchers sometimes harm wildlife, ruin opportunities for others to enjoy wildlife, and occasionally place themselves in danger. To avoid these situations, use the following guidelines carefully whenever you observe or photograph wildlife.

Minimize Disturbance Of Wildlife

Observe animals from a distance they consider safe. Use binoculars, spotting scopes, and telephoto lenses to get a closer look. If an animal shows signs of being crowded or disturbed, sit quietly or move slowly away.

Signs you are too close:

Mammals

- Head raised high, ears pointed in direction of observers
- Skittishness-jumps at sounds or movements
- Animal moves away or lowers head, ears back in preparation for a charge, erect hairs on neck and shoulders
- Displays aggressive or nervous behavior

Birds
- Head raised, looking at observers
- Skittishness
- Excessive preening or pecking at dirt or foot; bill wiping
- Alarm calls, repeated chirping and chipping
- Distraction display-broken wing, or tail spread

Move slowly, allowing the animal to keep you in view. Avoid sneaking up on or surprising animals.

Limit the time you spend at or near a nest to 5-10 minutes. Do not disturb the plants around the nest, or handle eggs or young. Keep far enough away from nesting colonies that you don't flush the birds.

Never chase, repeatedly flush, or harass animals (whether on foot, in a car, boat, plant, all-terrain vehicle, snow machine, or other vehicle). Harassing animals is against State law and punishable by a fine and jail sentence.

Never allow pets to dig up, chase, or harass wildlife.

Do not use tape recorded calls or other attraction devices, except in areas people visit infrequently, and use caution. Attracting bears by using predator calls can be extremely dangerous.

Respect The Rights Of Other Wildlife Watchers

Never approach an animal when other people are observing it. Inconsiderate observers who approach too closely ruin their own wildlife photos and those of others. Frightened or nervous animals are less interesting to watch, and experienced wildlife observers can easily tell if the animal in photo was alarmed or harassed.

Always obtain permission from landowners before traveling on private property, even if you just want to look at the plants or wildlife. Since passage of the Alaska Native Claims Settlement Act, millions of acres in the State have become the private property of Alaskan Natives.

Never litter or deface property. Thoughtless acts of trespass and littering soon lead to 'No Trespassing' signs and regulations that limit everyone's opportunities to enjoy wildlife.

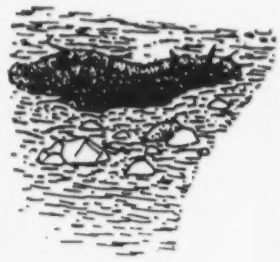
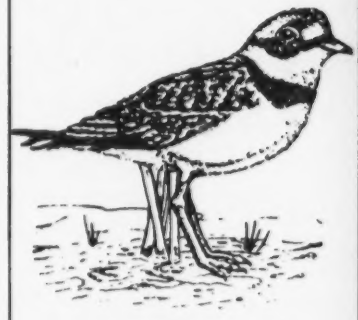
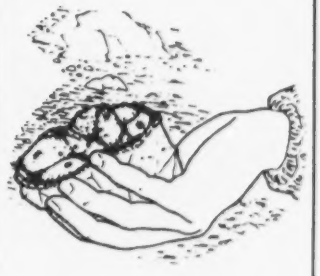
Avoid Dangerous Wildlife

Familiarize yourself with bear safety. Bears occur in almost every habitat in Alaska. A pamphlet entitled "The Bears and You," available free from the Alaska Department of Fish and Game, provides excellent tips for avoiding bear attacks.

Always keep a good distance between yourself and cow moose with calves. A cow may charge on little provocation and her flying hooves can seriously injure or kill a person.

62

WETLAND BINGO

CLOUD	DRAGONFLY	PLANT	LITTER
BEETLE	FLOWER	 MUD	 BIRD
TRACK	FISH	 ROCK	GRASS
FEATHER	MOSQUITO	FREE SQUARE	FROG

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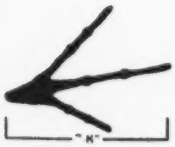
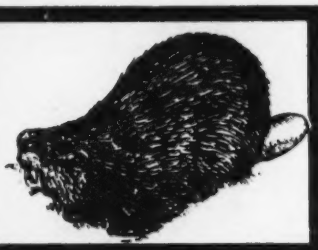
TRACKS WITH KIDS

A





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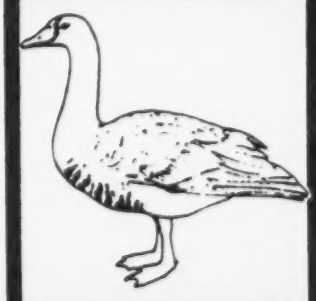


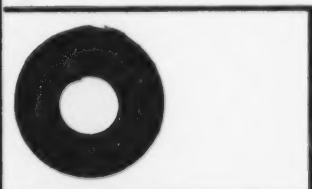
KIDS LOVE TO LOOK FOR AND IDENTIFY TRACKS! HERE IS A FUN ACTIVITY THAT WILL HELP THEM LEARN THE TRACKS OF SOME COMMON ALASKA MAMMALS.

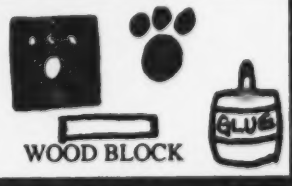
1. GET AN OLD TIRE INNERTUBE FROM YOUR LOCAL GARAGE AND CUT IT INTO PIECES APPROXIMATELY 3" X 3".

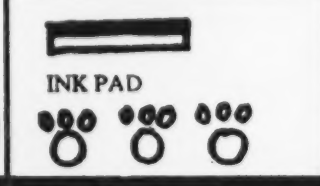
2. USING FIELD GUIDES OR PICTURES OF COMMON ANIMAL TRACKS, HAVE THE KIDS DRAW THEIR CHOSEN TRACK ONTO THEIR PIECE OF RUBBER.

3. NOW HAVE KIDS CUT OUT EACH PART OF THEIR TRACK AND REASSEMBLE THE PARTS ON A SMALL WOOD BLOCK WITH GLUE.

4. ONCE THE GLUE DRIES, THE RAISED RUBBER PIECES CAN BE INKED AND THEN STAMPED ON HANDS OR PAPER







D

G

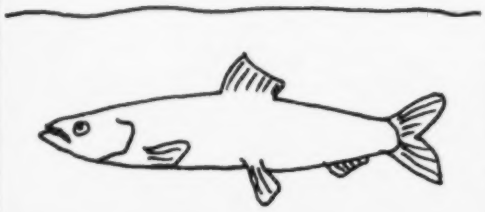
F

E

TRACKS WITH KIDS
ANSWERS

1. WOOD FROG, TRACKS = G
2. BEAVER, TRACKS =F
3. MOOSE, TRACKS = C
4. ARCTIC FOX, TRACKS = D
5. SANDHILL CRANE, TRACKS = A
6. GOOSE, TRACKS = E
7. BEAR, TRACKS = B

OSPREY WORKSHEET



THIS ALASKAN ANIMAL HAS A SHARP, HOOKED BILL AND TALONS FOR CATCHING FISH. CONNECT THE DOTS TO FIND AN **OSPREY**

WETLANDS WORD SEARCH

LOON

BEAVER

STICKLEBACK

SALMON

TERN

OTTER

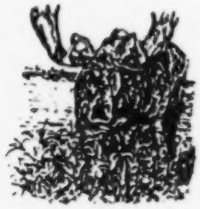
Z	F	B	Y	F	Y	Q	Y	R	S	L	H	F	X
O	H	S	T	I	C	K	L	E	B	A	C	K	O
D	N	V	M	S	A	N	D	P	I	P	E	R	E
S	A	L	M	O	N	R	B	E	A	V	E	R	V
L	V	M	C	J	W	D	S	Y	Z	F	P	D	B
E	M	S	U	Y	Z	J	X	A	Q	S	A	Z	X
D	U	C	K	O	P	R	X	G	L	W	O	D	Q
F	B	O	O	V	I	Q	B	R	O	T	T	E	R
O	J	O	C	W	E	T	L	A	N	D	S	X	J
I	M	A	Y	F	L	Y	M	I	D	G	E	V	K
P	P	M	U	S	K	R	A	T	L	O	O	N	Y
G	O	O	S	E	M	O	O	S	E	M	O	Z	Y
R	N	B	G	P	S	E	N	J	N	F	A	X	K
D	Q	Q	W	O	O	T	E	R	N	P	Y	X	R

The names of these Alaskan animals and their habitat are hidden in this puzzle. Can you find them?

MAYFLY

GOOSE

MUSKRAT



MOOSE

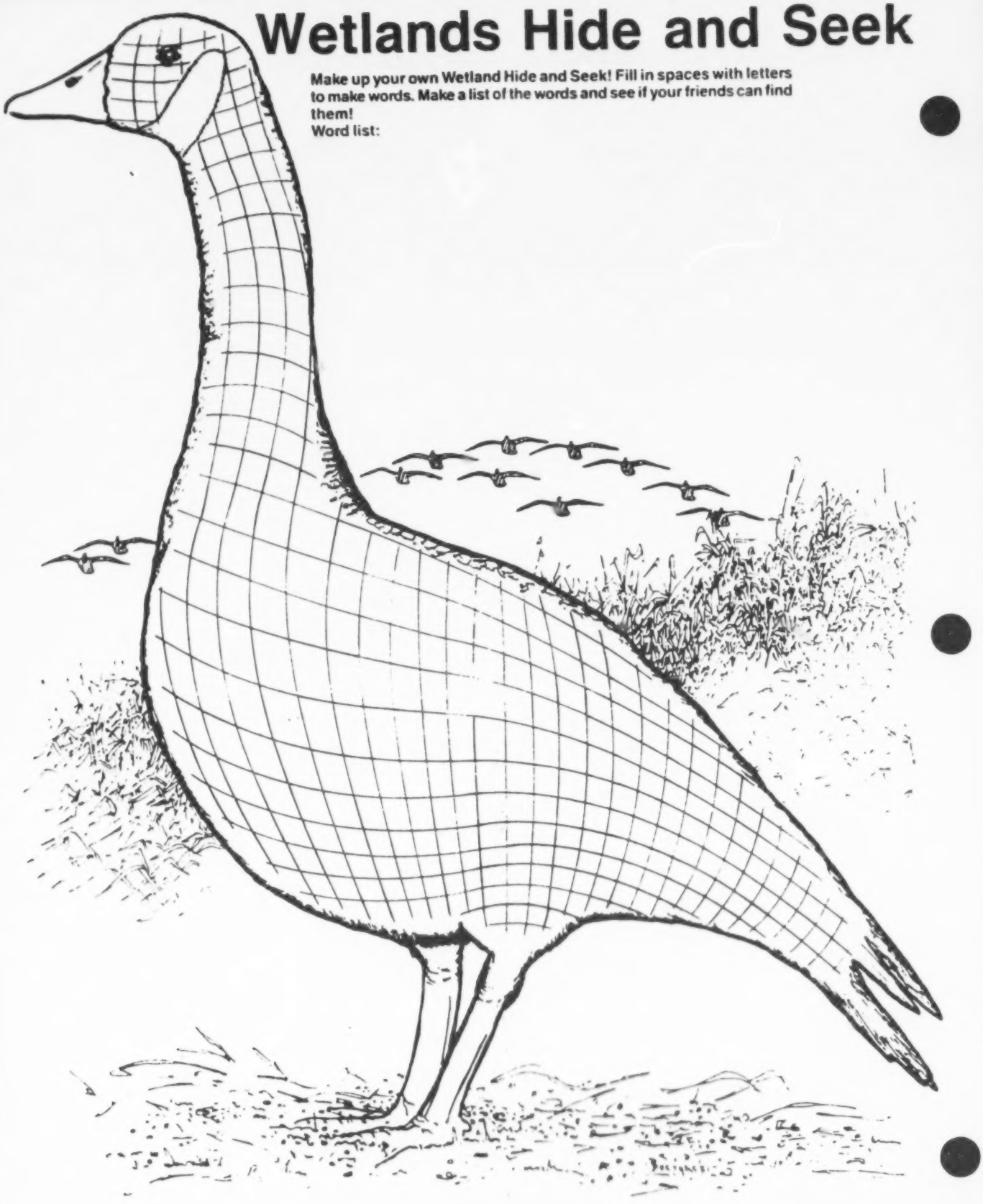
DUCK

SANDPIPER

MIDGE

Wetlands Hide and Seek

Make up your own Wetland Hide and Seek! Fill in spaces with letters to make words. Make a list of the words and see if your friends can find them!
Word list:



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HUMANS AND WILDLIFE

Objectives

Students will:

1. Generate a list of activities that can help or harm wildlife.

2. Discuss reasons why harmful activities are inappropriate.

Method

Students will brainstorm activities that are helpful or harmful to wildlife; then, they will break into small groups and use cards to discuss and classify different actions.

Background

This activity can be used with little preparation to have students begin thinking about how human activities affect wildlife. The major purpose of the activity is for students to discriminate between outdoor activities which are harmful to wildlife and the environment, and those which are not. It is a good introduction to a class project that will benefit wildlife or the environment (e.g., picking up litter, begin a recycling campaign).

Materials

- art materials to make discussion cards including crayons, construction paper, photos from magazines

Procedure

1. Ask students to help you make a list of things that people do that affect wild plants or animals in wetlands. Encourage them to brainstorm activities that people do in wetlands and to decide whether each activity helps or harms wildlife.

Examples of helpful things might be:
- Leaving bird nests alone.
- Keeping dogs on leashes when walking in the wetlands so they

Subjects: social studies, science, language arts, art
Skills: analysis, description, discussion, drawing, evaluation, generalization, problem-solving, group cooperation, synthesis
Duration: one or two 20-40 minute periods
Group Size: any
Setting: indoors or outdoors
Vocabulary: harm, wildlife
Topics: responsible human actions, environmental impact, people and wildlife sharing environments

won't scare birds.
- Putting up nest boxes for owls or swallows.
- Walking quietly through wetlands to avoid scaring wildlife.

Some examples of harmful activities might be:
- Driving vehicles (cars, three-wheelers) on wetlands.
- Littering, especially with plastic which animals might swallow.
- Picking up baby wild animals.
- Chasing or scaring animals.
- Building a road or airport that requires the filling in of a bird nesting area with gravel.
- Dumping oil into a wetland.
- Removing plants from their environment.
- Taking more fish and game than allowed by law.

2. Have students use cut-out photos or drawings to make these activities into cards with pictures and describing what is happening (or the teacher can prepare cards in advance, laminate, and use again).

3. Collect the cards. Divide the class into groups. Hand out one or more of the cards to each group. Ask them to discuss:
- What is happening?
- Does it help or harm wildlife? How?
- What else could happen that wouldn't harm wildlife?

4. Have the groups communicate to other groups. Ask each group to report to everyone else their feelings concerning what is happening in the picture and any alternatives they identified which would not harm wildlife. Older students can dramatize their alternatives with skits, "commercials," songs, poems, etc.

Reference

Project WILD. 1986. Western Regional Environmental Education Council.

Extensions

1. Discuss whether some human activities that may be harmful to wildlife can help people (examples: building a hospital on a gravel fill pad in a wetland where birds nest, building a road to a school across wetlands when there is no other alternative).

2. Ask the students to draw a picture of things they know about or have seen happen that would hurt wild plants or animals. Ask them to describe what is happening in their drawing and what could happen that would not be harmful.

STAMPS FOR BIRDS

Objective

Students will learn that federal and state Duck Stamps are a means to raise money to acquire and restore wetlands and manage them as wildlife habitat.

Method

Students will design and create a Duck Stamp and wetlands conservation message.

Background

"Duck Stamps" are a means for conserving wildlife habitat for waterfowl, many of which depend on wetland habitats. Since 1934, waterfowl hunters have been required to purchase a federal stamp each year in addition to their state hunting license. Since 1985, a state stamp has also been required in Alaska. Many people who do not hunt, but who may enjoy watching birds or who collect art, also purchase the attractive stamps and prints. Federal Duck Stamps are available for purchase at post offices. Alaska Duck Stamps can be bought at locations where hunting licenses are sold.

The federal Duck Stamp program, formally known as the Migratory Bird Hunting and Conservation Stamp Program, is a successful long-term conservation program for wildlife. Between 1934 and 1984, over 300 million Duck Stamp dollars have gone to preserve more than 3.7 million acres of habitat for waterfowl in North America, including many acres of wetlands. Many of the more than 400 National Wildlife Refuges in the United States have been paid for entirely or in part by Duck Stamp receipts. Designed as a program to benefit waterfowl, and known as the "Duck Stamp" program, sales of the stamps have benefitted many other fish and wildlife species that depend on the wetland and upland habitats provided by the program. The program has also benefitted humans by preserving the other important functions and values of wetlands.

The federal program was established in response to drastic declines in waterfowl that occurred after the Dust Bowl droughts of the 1920s and the rapid draining and conversion of wetlands throughout the country as America was settled. In 1929 a federal law was passed that authorized expansion of the existing National Wildlife Refuge System, but no funds existed to

Subjects: art
Skills: drawing, use of media
Duration: one class period
Group Size: individual
Setting: indoors
Vocabulary: Duck Stamp, refuge, conservation
Topics: habitat, wildlife management, conservation

purchase privately-owned land.

Cartoonist J.N. "Ding" Darling came up with the idea of the Duck Stamp and designed the first stamp. In 1934 the Migratory Bird Hunting Stamp Act was established to sell stamps to raise money to acquire or lease areas to be managed as waterfowl refuges and sanctuaries.

The State of Alaska established a state Waterfowl Conservation Stamp Program in 1985, reserving all revenues from the sale of stamps and also of art prints for conservation and enhancement of waterfowl, protection and acquisition of wetland habitats, and other projects that benefit waterfowl. The state stamp revenues have been used to construct pond and island complexes near Anchorage and Fairbanks to provide safe, new habitat for nesting ducks, to transplant Canada geese to Kodiak where they had never occurred, to acquire habitat in the Matanuska-Susitna Valley, and to pay much of the costs of producing this curriculum.

The annual federal and state stamp designs are selected by means of an art contest or artist competition. Any artist can enter either contest by submitting a 5 x 7-inch design of any waterfowl species and paying an entry fee in the federal contest or by sending in a design of waterfowl species chosen as subjects for that year in the state contest. Winning entries are chosen in each case by a panel of art and waterfowl experts. Since 1985, the emperor goose, Steller's eider, spectacled eider, trumpeter swan, and goldeneye have been featured on Alaska state stamps and prints.

Collecting duck stamps and prints is a fun hobby enjoyed by many. They are an investment, and they increase in value over the years because only limited numbers are printed each year.

For more information read the brochure "The Duck Stamp Story."

Materials

- "The Duck Stamp Story" film (optional)
- art materials
- field guides or books with color pictures of birds

Procedure

1. Show the film "The Duck Stamp Story," if available. Either show your students a duck stamp or print (federal stamps can be purchased at any post office; state stamps can be purchased from hunting or fishing license vendors) or ask them if they have ever seen a duck stamp or print. (Students older than 16 are required to purchase them if they hunt waterfowl.) Discuss why duck stamps or prints are sold. Ask them how money from the sales could be used to help waterfowl (by providing habitat).

2. Explain that both the federal government and the Alaska Department of Fish and Game hold art contests or artist competitions each year to select the design for Duck Stamps. The students' art project will be to draw or paint a bird in a wetland habitat and to design a message about what humans can do to help birds that live in wetlands. Depending on the variety of pictures you can provide for reference, either the class can vote on the bird they want on their stamp, you can choose a single bird species which could be the current subject of the state competition, or the students can each choose whichever bird they want to draw or paint.

References

"The Duck Stamp Story." (film) U.S. Fish and Wildlife Service.

"The Beautiful Collectible Duck Stamp." (video) U.S. Fish and Wildlife Service.

Aquatic Project WILD. 1987. Western Regional Environmental Education Council.

Extensions

1. The class can vote to select a winning picture. They could make copies of the winning picture and sell them in the community to raise money for bird guides, equipment for field trips, or other projects related to birds or wetlands.

2. The class can promote the sale of Federal and Alaska duck stamps in the community by using their art projects as posters or by taping public service announcements for local radio or television stations.

3. The class can view the video "The Beautiful Collectible Duck Stamp, 1989-1990."

4. Have students do "Migration Headache" from Aquatic Project WILD, so disappearing wetlands make sense to them.

GLOSSARY

adaptation: a trait that improves a plant or animal's ability to live in a particular environment.

aquatic: lives in water.

bird banding: means of marking birds with bands to obtain data about their flights, migration, and habits.

bog: a peat-forming ecosystem influenced solely by water which falls directly on to it as rain or snow and generally dominated by sphagnum moss.

breeding ground: a land area occupied by migratory birds during the nesting season.

carnivore: a meat-eater.

carrying capacity: the total number of any species that a given area of habitat will support at any given time; the ability of a given unit of habitat to supply food, water, cover or shelter, and necessary space to a wildlife species.

community: all the plants and animals in a particular habitat that are bound together by food chains or other interrelationships.

condensation: water changes from a gas to a liquid form.

conservation: the use of natural resources in a way that assures their continuing availability.

consumer: a living thing that gets energy (food) by eating other living or dead things.

detritivore: a living thing that eats dead things and waste, also called a decomposer.

ecosystem: all living things and their non-living surroundings in a specific area.

emergent: plants that grow in water but have leaves and flowers above the surface.

endangered: an "endangered" species is one which is in danger of extinction throughout all or a significant portion of its range.

estuary: where saltwater and freshwater meet, the water is brackish.

evaporation: water changes from a liquid to a gas form.

flyways: general routes of travel used by birds when migrating between breeding and wintering grounds. For geese and ducks, there are four major flyways in the United States; Atlantic, Mississippi, Central and Pacific. The actual migratory routes of individual bird species may vary from these general flyway patterns.

food: energy and minerals in a form living things can use.

food chain: the path of energy and minerals from the non-living environment through producers and consumers back to the non-living environment.

food web: all the interconnected food chains within a particular ecosystem.

habitat: the place where an animal lives that provides food, water, shelter, and space in the proper arrangement.

herbivore: an animal that eats plants.

lagoon: a shallow body of water separated from the sea by sand bars.

management: as related to wildlife, the application of scientific knowledge and technical skills to protect, preserve, conserve, limit, enhance, or extend the value of wildlife and habitat.

marsh: an area periodically wet or continually flooded, but non-peat forming, composed of such as sedges, rushes, marestail and other soft-stemmed plants.

metamorphosis: change of body form during growth.

migration: seasonal or periodic movement between breeding and wintering grounds. Bird migration varies among species in terms of destinations, time and duration. Generally migration is accomplished to use better feeding areas.

nonrenewable resource: nonliving resources such as rocks and minerals; resources which do not regenerate themselves; substances such as petroleum, coal, copper, and gold which, once used, cannot be replaced (at least not in this geological age.)

permafrost: perennially frozen ground that may or may not contain ice.

photosynthesis: the way that plants and algae change sunlight, water and carbon dioxide into food.

pollution: harmful substances deposited in the air, water or land which result in adverse changes to their quality.

population: the number of particular species in a defined area.

precipitation: rain, snow, sleet, hail, ice fog, or any other form of water falling to the ground.

predator: an animal that kills and eats other animals (prey).

prey: animals that are killed and eaten by other animals (predators).

producer: any living thing that makes it own food.

renewable resource: living resources, such as plants and animals, which have the capacity to renew themselves when conditions for survival are favorable.

threatened: a "threatened" species is one that is likely to become endangered because of a decline in its numbers.

water cycle: the continuous circulation of water in systems throughout the planet.

wetland: any land area that tends to be regularly wet or flooded during part of the year and have plants that prefer wet soil.

RESOURCES

National Wildlife Refuge System. Department of the Interior, U.S. Fish and Wildlife Service. 1011 E. Tudor Road, Anchorage, Alaska 99503. Pamphlet describing the nation's refuge system. Cost: free.

The Duck Stamp Story. Department of the Interior, U.S. Fish and Wildlife Service. 1011 E. Tudor Road, Anchorage, Alaska 99503. Pamphlet describing the federal duck stamp program. Cost: free.

America's Endangered Wetlands. Department of the Interior, U.S. Fish and Wildlife Service. 1011 E. Tudor Road, Anchorage, Alaska 99503. Pamphlet describing wetlands conservation. Cost: free.

Ducks at a Distance: A Waterfowl Identification Guide. Alaska Natural History Association. 250 Cushman Street, Suite 1A Fairbanks, Alaska 99701. Cost: $1.00.

Ducks Get Sick, Too! Department of the Interior, U.S. Fish and Wildlife Service. National Wildlife Health Research Center. 6006 Schroeder Road, Madison, Wisconsin 53711. Booklet describing waterfowl diseases. Cost: free.

Lead Poisoning In Waterfowl. Department of the Interior, U.S. Fish and Wildlife Service. 1011 E. Tudor Road, Anchorage, Alaska 99503. Pamphlet describing the effects of lead shot ingestion on waterfowl. Cost: free.

How to Obtain Aerial Photographs. Department of the Interior, U.S. Geological Survey. 222 W. Seventh Avenue, Anchorage, Alaska 99503. Ordering information for maps and aerial photos. Cost: free.

Understanding Color Infrared Photographs. Department of the Interior, U.S. Geological Survey. 222 W. Seventh Avenue, Anchorage, Alaska 99503. How infrared satellite photos are made. Cost: free.

America's Wetlands, Our Vital Link Between Land and Water. Environmental Protection Agency. Office of Wetlands Protection, Office of Water. Washington, D.C. 20460. Booklet describing wetlands protection policy. Cost: $1.25.

Pacific Estuaries. (Videotape) Ducks Unlimited Canada. Available from Department of the Interior, U.S. Fish and Wildlife Service. 1011 E. Tudor Road, Anchorage, Alaska 99503. Cost: free on loan.

Wild Heritage — Geese in Alaska. (Videotape) Department of the Interior, U.S. Fish and Wildlife Service. 1011 E. Tudor Road, Anchorage, Alaska 99503. Videotape showing the natural history of Alaska's geese. Cost: free on loan.

The Beautiful Collectible Duck Stamp. (Videotape) Department of the Interior, U.S. Fish and Wildlife Service. 1011 E. Tudor Road, Anchorage, Alaska 99503. Videotape showing the process of selecting and producing federal duck stamps. Cost: free on loan.

Waterfowl for the Future (The North American Wildlife Management Plan.) (Videotape) Department of the Interior, U.S. Fish and Wildlife Service. 1011 E. Tudor Road, Anchorage, Alaska 99503. Cost: free on loan.

Wetlands in Crisis. (Videotape) Department of the Interior, U.S. Fish and Wildlife Service. 1011 E. Tudor Road, Anchorage, Alaska 99503. Cost: free on loan.

Status of Ducks — July 1989. (Videotape) Department of the Interior, U.S. Fish and Wildlife Service. 1011 E. Tudor Road, Anchorage, Alaska 99503. Cost: free on loan.

Alaska Department of Fish and Game
Division of Wildlife Conservation
P.O. Box 3-2000
Juneau, Alaska 99802-2000
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U.S. Fish and Wildlife Service
Office of Resource Support
1011 Tudor Road
Anchorage, Alaska 99503
(907) 786-3351

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